...AW-HILL CO. OF CALIFORNIA JANUARY 1936 PRICE 25 CTS. PER COPY

ELECTRICAL WEST

OUT OF THE RED

1935 was a good year for the electrical industry, which shared in the general business recovery. 1936 promises to bring even greater progress and profits. The industry is definitely back in the sunshine, heading upward to new record heights.

TK1
.E495

1936 the Smash Year

We're all "going to town" this year!

Never before have conditions been so right for smashing record-breaking sales.

We hope you get your share.

The Edison Company is launching the biggest advertising drive in their history—starting January 9, and ending April 15—featuring the ALL-ELECTRIC KITCHEN and emphasizing the Electric Range, Electric Water Heater and Electric Refrigerator.

Premiums . . . three separate newspaper campaigns in 170 newspapers . . . 300 billboards . . . 1400 radio announcements over 7 local radio stations . . . 50,000 pieces of direct mail . . . window displays . . . the Electric Times . . . all will carry the story of the ALL-ELECTRIC KITCHEN.

We've spent a lot of time, money and energy on this advertising—but it's only a part of the job. The rest is up to you. Do your part and make

1936 the smash year

SOUTHERN CALIFORNIA Edison **EDISON COMPANY LTD.**

1-36

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ELECTRICAL WEST

With which are consolidated the "Electrical Journal," the "Journal of Electricity, Power and Gas," and the "Journal of Electricity."

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Contents for January 1936

Volume 76 Number 1

What Makes an "Anti-"? 21
Engineering Symposium 24
Electra's Husband—"Plow Up and Pay" 30
Cooperation on Parade 31
Appliance Sales Guide 37
Bill Jones Speaks "On Unfinished Business" 41
Goodwill Building Ideas 42
Rural Load Building 44
In the Realm of Science 46
Trade Associations 48
Editorials 50
Significant Trends 52
News of Note 58
Where to Buy It in the West 69

▼

• IN ENGINEERING, San Diego's plan for detecting and preventing current diversion contains some worthwhile data. Also in that section, the engineer will find a description of how the Southern Utah Power Co. conquered the problem of silt erosion in one of its hydro plants. For those interested in control applications, the installation on the Park St. Bridge suggests new ideas of reliability of operation and safety precautions.

•

• ONE OF THE MOST interesting and valuable of industry articles is that of H. A. Lemmon entitled "What Makes an 'Anti-'?" In this article, Mr. Lemmon probes into the background of fifteen customers (ten of whom signed a municipal ownership petition) to find out why they felt as they did about the utility. Case histories always make fascinating reading.

•

• HOLIDAY TIME was harvest time for electrical dealers in the West if the success of numerous appliance expositions described in 'Cooperation on Parade' is any criterion. Read about them and become convinced that the pioneering of the West in cooperative selling is beginning to pay big dividends.

•

•IN THIS ISSUE, the first of ELECTRICAL WEST'S cooperative Sales Guides appears on pages 37-40. For the next twelve issues this feature will present terse, pertinent pointers on the successful selling of appliances. Included in it will be the second series of 'Sales Talks that Sold Appliances' by that master salesman, Bill Smith, who works for the power companies in the Northwest and Intermountain territories and who has gained nation-wide recognition for his last year's work in demonstrating profitable selling methods in this publication.

•

• POOR BILL JONES is almost at death's door from pneumonia. Even so, his clear-thinking mind points out to his friend, the Manager of the local power company, a lot of unfinished business that awaits the attention of the industry. Frankly, the editors don't know whether Bill Jones will pull through but we feel sure that letters directed to him (care of ELECTRICAL WEST) from his friends, and he must have many, would be deeply appreciated by this friendly personality who has worked the past year to help all of us on some of our problems. How about it?

•

NEXT MONTH

The seventeenth annual Progress and Planning number of ELECTRICAL WEST, containing invaluable statistical data of 1935 achievements and 1936 programs, covering all phases of the electrical industry, will be our special feature.

Another ACHIEVEMENT of Corning Laboratories is the casting of the largest glass disc in the world . . . for the 200" telescope at the Mount Palomar observatory.

Methuselah of Materials

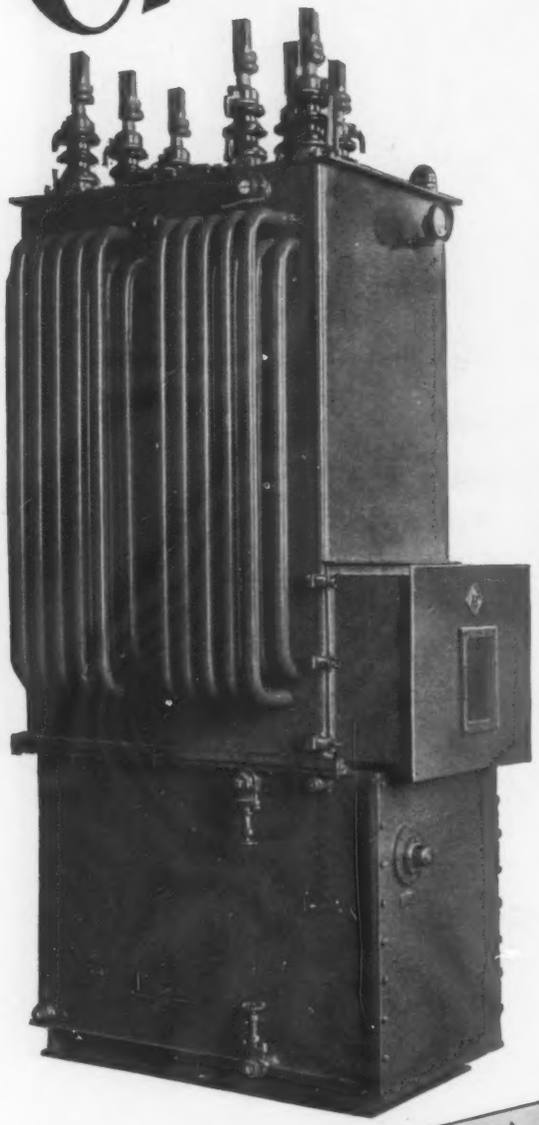
WHAT characteristics insure long life for insulators?
One may properly say: "If a material having proper insulating values is found . . . a material that DOES NOT DETERIORATE, then you have a long lived insulator."
The PYREX Brand glass used in the manufacture of insulators assures long life and maximum thermal resistance at all times.
These thermal characteristics enable the insulator to withstand power arcs of great magnitude without shattering . . . and sudden temperature changes.
And in addition, the TRANSPARENCY of PYREX insulators prevents their overheating in sunlight . . . and the temperatures attained are uniform top and underside.
Such characteristics give an insulator the OPPORTUNITY to become long lived.

"PYREX" is a registered trade-mark and indicates manufacture by

CORNING GLASS WORKS • CORNING, NEW YORK

PYREX POWER INSULATORS

Check THESE POINTS WHEN PURCHASING STEP REGULATORS



1. ARE 5/8% STEPS USED?

Type AFR Regulators use 5/8 % steps, which permit setting the primary relay the same as with induction regulator practice without excessive regulator operations. 5/8 % steps also result in less contact deterioration than larger size steps.

2. ARE THE MOVING AND STATIONARY CONTACTS OF LIBERAL SIZE AND MADE OF NON-ARCING METALS?

Type AFR Regulators use large size contacts, both stationary and moving, made of special non-arcing metals.

3. IS A QUICK-BREAK MECHANISM USED IN THE OPERATING MECHANISM?

The use of a quick-break mechanism gives uniformly high speed contact separation regardless of voltage conditions on the line, results in much longer contact life, and eliminates the necessity for a brake on the motor with its attendant maintenance expense. Type AFR Regulators use a quick-break mechanism of unusual simplicity.

4. DOES THE DRIVING MOTOR REQUIRE A BRAKE TO ASSURE ACCURATE STOPPING ON POSITION?

AFR Regulators do not use a motor brake. The action of the quick-break mechanism makes this unnecessary.

5. ARE ALL OPERATING PARTS COMPLETELY SUBMERGED IN OIL?

All moving parts of Type AFR Regulators requiring lubrication are completely submerged in oil, including the driving motor.

6. IS A PANEL VOLTMETER FURNISHED AS STANDARD EQUIPMENT?

The AFR Regulator is equipped with a panel voltmeter which indicates the regulated voltage at the regulator and at the load center.

7. IS AN OIL IMMERSED, EASILY ADJUSTABLE TIME DELAY CONTACTOR FURNISHED?

AFR Regulators are furnished with a time delay contactor that can be easily adjusted for time delays of from two seconds to two minutes. Oil immersed, the contactor eliminates the effect of atmospheric conditions on its operation.

ONLY ALLIS-CHALMERS TYPE AFR STEP VOLTAGE REGULATORS HAVE ALL THESE FEATURES . . .

WRITE FOR ENGINEERING BULLETIN No. 1170

ALLIS-CHALMERS

— Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, U.S.A. —

NOW
STILL GREATER
PROTECTION
with the improved
DELTABESTON
POWER CABLE

Purified Asbestos Increases Its Dielectric Strength!

General Electric's Deltabeston research laboratories have developed a process whereby the asbestos fibres used for Deltabeston insulation are *purified* to a considerably greater extent than any other commercial asbestos available. *All organic materials detrimental to the electrical properties of asbestos have been removed.* The process is exclusive to Deltabeston.

The improved Deltabeston Power Cable with *Purified* Asbestos Insulation has a much higher dielectric strength, and a wider safety factor. It offers positive protection against the heaviest loads, far exceeding test requirements. It resists heat, flame, moisture, oil, grease and corrosive vapors.

There are two types. Deltabeston Asbestos and Varnished Cambric Insulation operates permanently in temperatures up to and including 250 degrees F. Deltabeston All-asbestos Insulation operates permanently in temperatures up to and including 400 degrees F.

For complete information and samples of the improved Deltabeston Power Cable with *Purified* Asbestos Insulation, see your nearest G-E Appliance and Merchandise Distributor, or send the coupon below.

Deltabeston Wire and Cable Division, Section Y-661
General Electric Co., Bridgeport, Conn.

Please send me samples of the improved Deltabeston Power Cable and your new Deltabeston catalog describing the development of *Purified* Asbestos Insulation.

Name.....

Company.....

Street.....

City.....State.....

GENERAL ELECTRIC

Deltabeston Wire & Cable

APPLIANCE AND MERCHANDISE DEPARTMENT,
GENERAL ELECTRIC COMPANY,
BRIDGEPORT, CONN.

EIGHT-STRAND A·C·S·R·

CUTS YOUR LINE COSTS

● Eight-Strand A. C. S. R. is 25% stronger. The increased strength-weight ratio permits you to lengthen spans and to cut costs, radically, without stressing the conductor beyond the safe limits dictated by long experience.

A. C. S. R., in fundamental principle, represents the most perfect combination of strength, conductivity, and lightweight. The new stranding (seven Aluminum over one steel) simply steps this time-tried principle forward into new levels of economical performance.

8-strand A. C. S. R. uses the same fittings as equivalent 7-strand! Both conductors may be used on the same system without duplication of storeroom stocks.

For maximum reliability and protection against vibration fatigue, abrasion, and flashover burns, use armor rods. They are particularly desirable for substandard lines.

Our usual complete data are available. Send for them now. ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh, Pa.

ALCOA ALUMINUM

THE NEW GENERAL ELECTRIC RANGE

30% Faster! uses 45% less Current!

Model G-20

THE Speedster

WITH THE NEW EXCLUSIVE G-E

"TRIPL-OVEN"

"THE NEW G-E Speedster is the greatest advance in electric cooking in ten years," says a famous home economist! "The range with sales volume and profit written all over it!" say dealers who have seen it. Priced to sell to the *mass market,* the new G-E Speedster is years ahead of the procession in speed, economy, features, styling.

6 Exclusive Sales Features!

1—New oversize G-E "Tripl-Oven."

2—New G-E Duplex Hi-Speed CALROD Oven Unit. *Pre-heats pastry space to 475° in 5 minutes.*

3—New G-E Twin Terminal Connections.

4—New G-E Economizer gives unequalled oven speeds, saves current.

5—New G-E Super-Speed Broiler.

6—New G-E Smokeless Broiling Pan with aluminum smokeless shield.

Other features include G-E Hi-Speed CALROD surface units; new smooth top, 6-quart Thrift Cooker; sliding oven shelves; automatic temperature control with pilot light; appliance outlet; modern table-top styling; gleaming white all-porcelain finish with black and chrome trim.

Write for Details!

Be the first in your locality to introduce this amazing new range! See your G-E Refrigerator Distributor NOW or write direct for all particulars. General Electric Company, Appliance and Merchandise Department, Section RC1, Nela Park, Cleveland, Ohio.

1

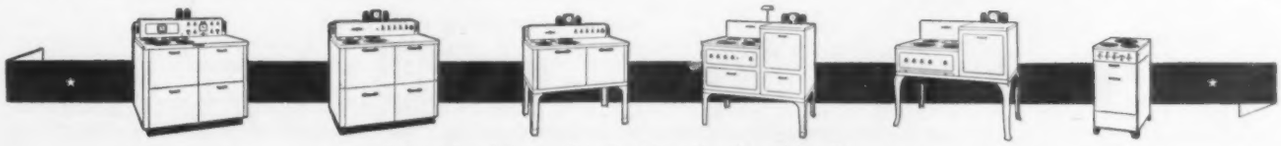
Super-Speed Pastry Oven gives as much as 30% faster baking speeds—uses up to 45% less current.

2

Super-Fast Broiler. Has 2400 or 3600 watts for broiling. Equipped with Smokeless Broiling Pan.

3

Roasting Oven with 5% greater capacity than standard 16 inch oven. Accommodates 20 lb. turkey.



A Complete Line and a Complete Merchandising Program

10 YEARS OLD..

67 *years in business!*

On January 1, 1926, a new name...Graybar... was born. As successor to the Supply Department of the Western Electric Company, Graybar continued an experience and a reputation for quality that started in 1869...Since 1926, the scope of Graybar's service to the electrical industry has steadily increased. To buyers everywhere, Graybar stands today not only as a convenient, economical source of 60,000 electrical items, but as an ever-active, friendly promoter of the *use* of everything electrical.

OFFICES IN 77 PRINCIPAL CITIES — EXECUTIVE OFFICES: GRAYBAR BUILDING, NEW YORK, N. Y.

COMING SOON . . .

A SMASHING DRIVE

to make sales for G-E Home Laundry Dealers!

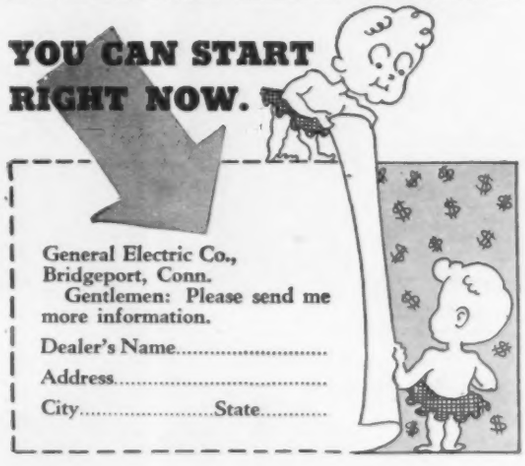
This drive will open up your market — make NOW prospects out of MAYBE'S — get valuable local publicity for you — increase your store traffic — give you an excellent prospect list for future sales . . . and make immediate sales! It will make customers ASK your salesmen into their homes.

This drive will be completely organized — powerful — successful! Every assistance for your profit will be extended. No campaign ever staged by General Electric Home Laundry Equipment will equal it. Get into the OLD TIMER SALES DRIVE!

Don't overlook this opportunity. If you do not sell G-E Home Laundry Equipment now, start with this drive. The G-E Line with its 6 Major Features is unequaled in the industry.

IT STARTS NEXT MONTH.

YOU CAN START RIGHT NOW.



General Electric Co.,
Bridgeport, Conn.
Gentlemen: Please send me more information.
Dealer's Name.....
Address.....
City.....State.....

GENERAL ELECTRIC

HOME LAUNDRY EQUIPMENT

APPLIANCE AND MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONN.

YOU CAN DO

REAL TRICKS (with profits) IN '36

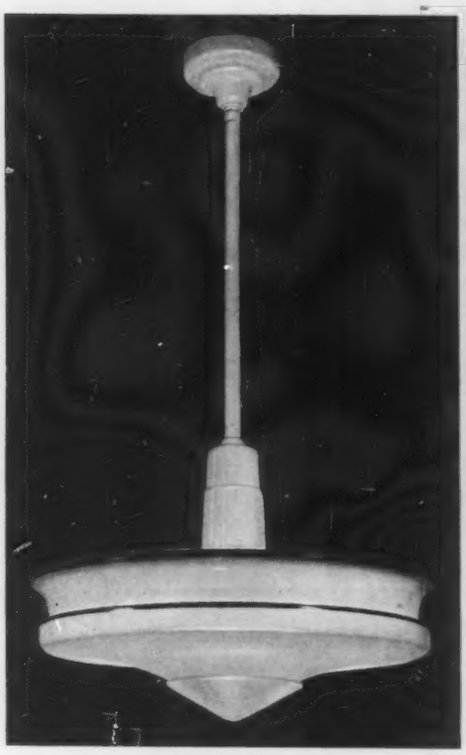
with

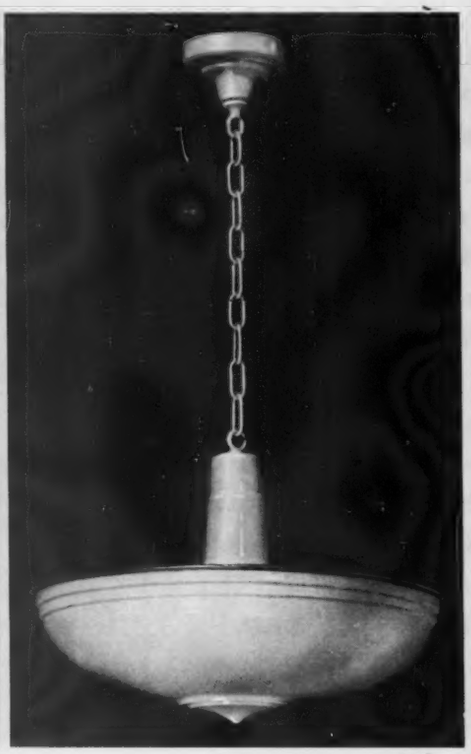
SIGHT-CRAFT

LUMINAIRES

Good lighting IS desired. The **low price** of SIGHT-CRAFT LUMINAIRES makes it possible to **"get the orders".** These two all-metal beauties—the 'VENUS' on the left) and the 'APOLLO' (on the right) produce the **high intensity** standards recommended and conceded as **essential to eye comfort** and **efficiency** . . . . . Low price — unique construction — 'VITROLUX' everlasting finish — are features of SIGHT-CRAFT lighting equipment that make **selling easy. Thousands of users** include leading commercial and industrial buyers. **Made in the West** for exacting Western requirements. Order SIGHT-CRAFT samples now through your jobber and get an **early start** on the **profits** that come from selling **scientifically correct** lighting jobs.

Let us help you with your lighting problems.





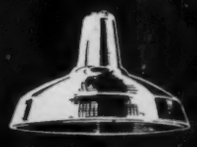
SMOOT-HOLMAN COMPANY
SIGHT-CRAFT
INGLEWOOD CALIFORNIA
MADE IN U.S.A.

SMOOT-HOLMAN COMPANY

Inglewood, California

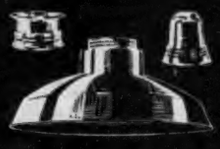
San Francisco	New York	Seattle
154 Eighth Street	10 Jones Street	532 First Ave. So.

SIGHT-CRAFT
INDUSTRIAL UNITS
HAVE EXCLUSIVE
"VITROLUX"
FINISH
Insuring
long, durable and efficient service under the most severe atmospheric conditions.

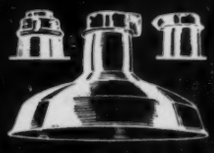


STANDARD DOME
Socket Type

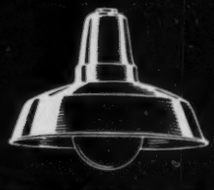
DEEP BOWL
Threaded Neck, Type "RR"



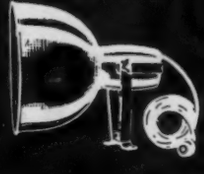
STANDARD DOME
Threaded Neck, Type "RR"



STANDARD DOME
With Separable Fitting



Dust and Vaporproof
REFLECTORS
NEC Standard



UTILITY LIGHT
For Gardens, Industrial Yards, Garages and General Floodlighting

for '36 GET THE ORDER Early

THE BOOM IS ON FOR '36

Straws in the wind indicate that 1936 will be the biggest range and water heater year in history. Money is circulating, people are spending and government activity is accelerating home modernizing. Now is the time to "Get the Order"

● Public opinion has crystallized in favor of the Electric Range. Sales efforts will yield big returns. Utility promotion of electric cookery is speeding up the swing to electric ranges.

Hotpoint is ready with another dynamic year 'round program with GET THE ORDER as the watchword. A series of completely organized campaigns and a mass of new and lively material—now ready—enables you to start selling in January and continue throughout the year.

A great new line of Hotpoint Ranges and a full line of Electric Water Heaters include beautiful styling, many new features and new low prices.

Hotpoint's national advertising will be powerful and far reaching, creating millions of new prospects.

Calrod—the long-life hi-speed heating coil will be advertised to the public in a forceful and dramatic way.

GET THE ORDER for Ranges and Water Heaters before the public spends its money for other equipment. Hotpoint's Plans are now ready. Start now. Keep it up all year.

Get all the facts from the Hotpoint Representative in your district, and start your campaign early.

1936 IS A HOTPOINT YEAR

ELECTRIC Hotpoint AUTOMATIC

RANGES AND WATER HEATERS

THE BELMONT. *A new Hotpoint style and price leader. Full all-porcelain enamel with hi-speed Calrod units, and Thrift Co*

THE STRATFORD. *(Above) A newly styled quality range as companio to the New Era and Mayfair. Full porcelain enamel in white or ivor*

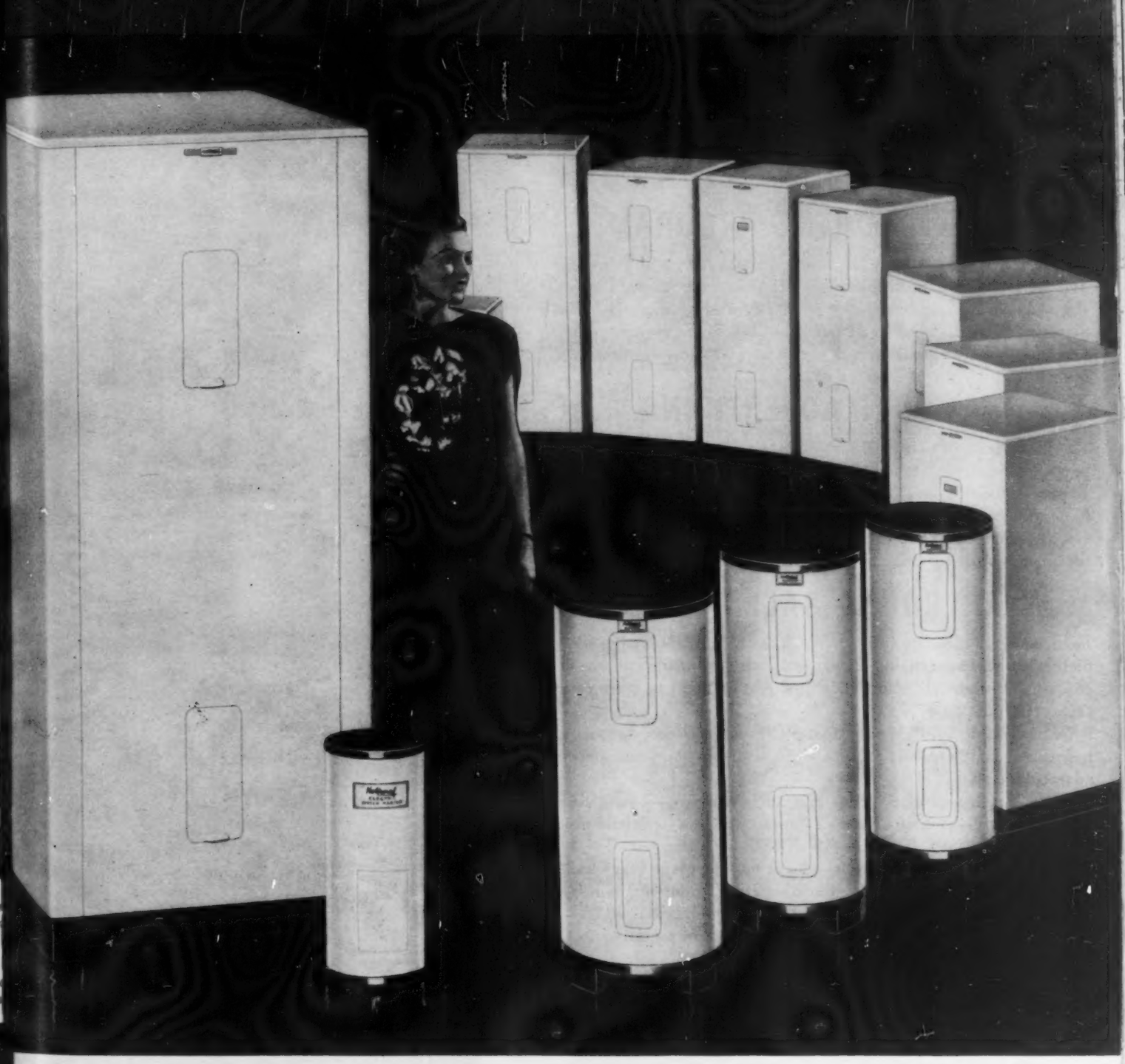
THE DAWN. *(Above) Hotpoint's style sensation. Full porcelain enamel in white or French gray, trimmed with chromium.*

THE NEW ERA. *(Below) All-porcelain in white or cameo ivory. Calrod, Thrift Cooker, Automatic Timer Clock.*

THE MAYFAIR. *(Below) Hotpoint's deluxe, six unit range with tw ovens. Full porcelain enamel, styled for modern built-in kitchen*

★ ★

"W



NOW, A COMPLETE LINE OF HOTPOINT ELECTRIC WATER HEATERS

● The popular new Vogue Square-Type Heater of striking modern design, which was introduced last year by Hotpoint, is now offered in a full range of capacities. With this beautiful new line of Water Heaters including a size for practically every home, there is no need to lose a sale. The Vogue is presented in sixteen different sizes. The remaining seven models are circular-type heaters, varying in size according to capacity. All of the new models are finished in white Calgloss enamel and are set upon a four-inch steel base which provides an attractive black trim. The black base is inset

Calrod, the sealed unit, is immersed within the tank, delivering all heat generated directly to the water. No heat loss by radiation. ● The new Hotpoint Heaters are designed for installation either as part of the modern all-electric kitchen, or for installation in modernized basements where appearance is an important factor. ● Line up with Hotpoint. Ride with the 1936 home-building and modernizing boom. GET THE ORDER now and keep going all year. Hotpoint is ready with a complete program—see the Hotpoint representative in your district now, for complete information.

"WHY *are more and more manufacturers offering* MONEL METAL *work-tops on their ranges?*"

"Because Monel Metal is TROUBLE-PROOF!:

"Hot pots and pans don't affect it.

"It doesn't permanently stain.

"It has no coating to crack, chip, or peel off; it's solid through and through.

"It is an alloy of two-thirds Nickel and one-third copper, so it cannot rust.

"The bright gleaming appearance of Monel Metal is PERMANENT . . . in fact, improves with use. This is proved in the experience of hotels, ships, and trains where Monel Metal equipment after 20 to 25 years of service still looks as bright as the day it was installed, or brighter."

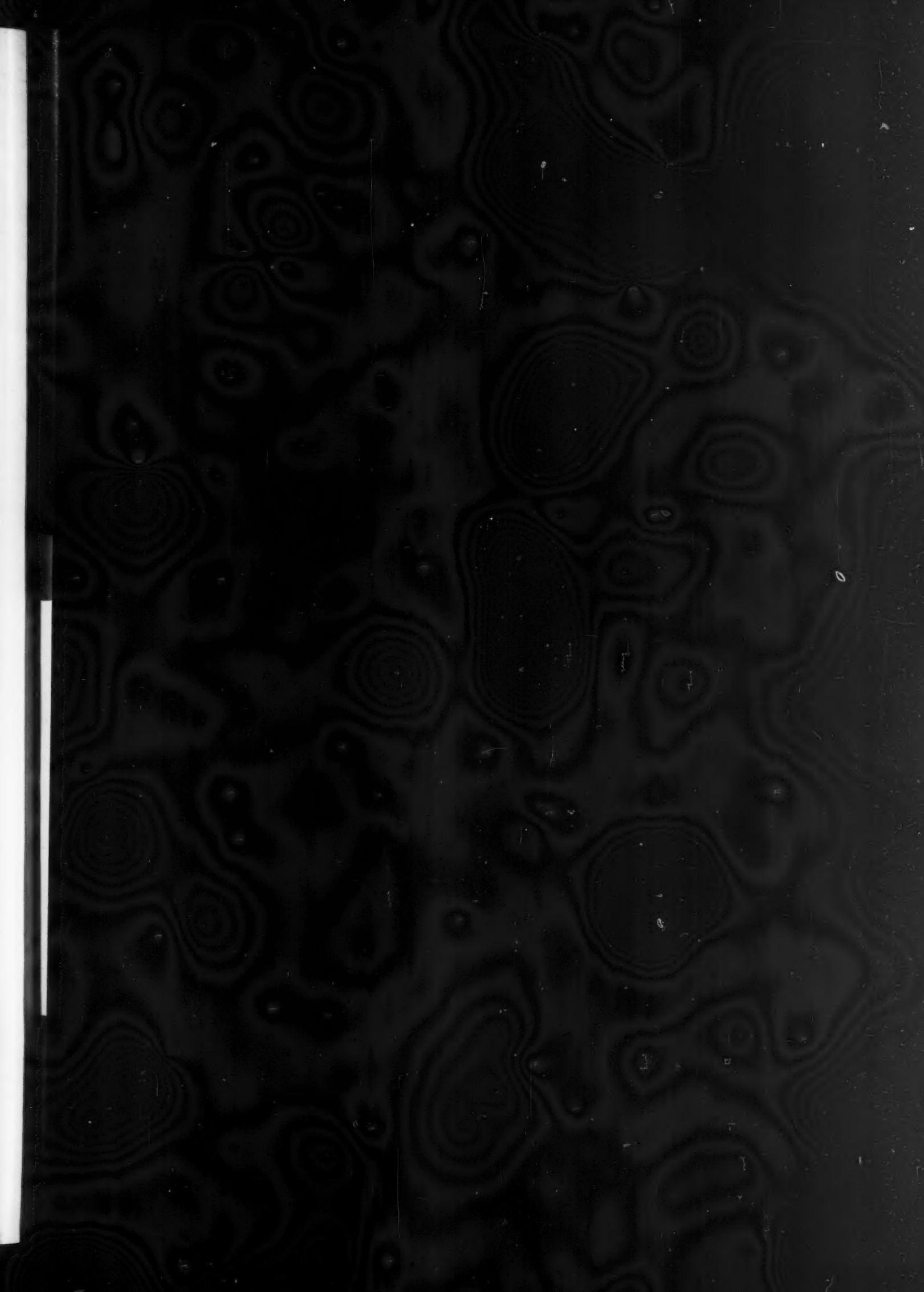
More and more the trend in modern kitchens is toward MONEL METAL work surfaces. This trend is furthered by advertising appearing throughout the nation on MONEL METAL sinks, counters, and ranges.

Be sure to have a representative selection of MONEL METAL-topped ranges on display. They always attract attention and start sales. And they will more than pay their way on your showroom floor.

MONEL METAL

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.



THE NEW **Westinghouse**

"ECONOMIZER"

SPEED UNITS

MADE IN THREE TYPES

COROX ECONOMIZER (ALSO STANDARD WHITE)

EBONITE ECONOMIZER

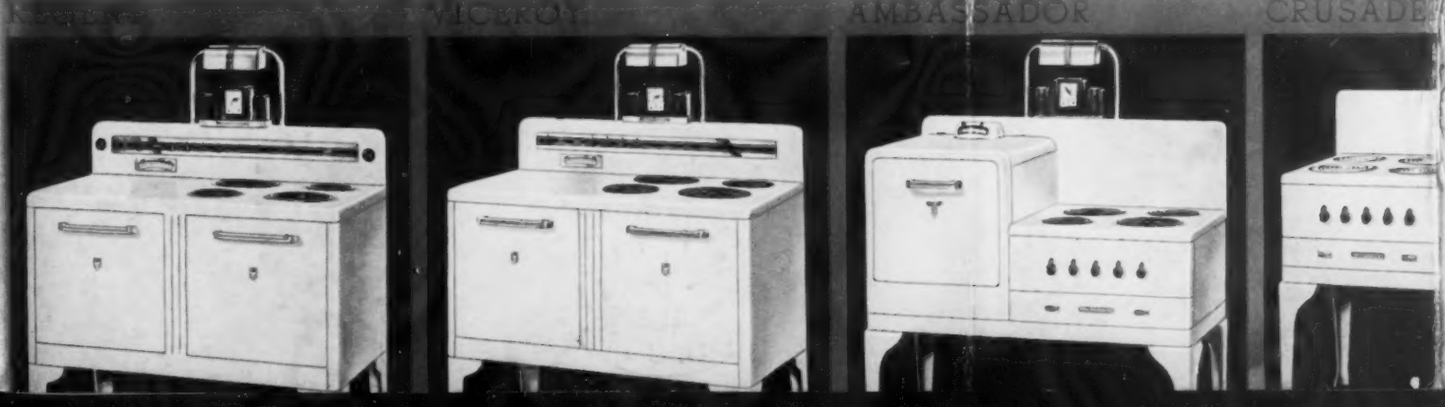
A Triumph of Westinghouse Engineering that combines TOP SPEED with AMAZING ECONOMY

Brings food to boiling temperature with record speed . . . then keeps it cooking as fast as food can cook (steaming or "simmering") with only 40% as much electricity as the "low" on other electric ranges! Improves cooking performance . . . brings top speed without danger of burning the food . . . gives longer element life because of increased low-wattage operation.

HERE'S THE PROOF

Typical examples of the savings on ordinary, everyday cooking

	ORDINARY UNIT		"ECONOMIZER"	
BOILED POTATOES on 1200 watt units	HIGH 5 mins.	100 watts	HIGH 5 mins.	100 watts
	LOW 10 mins.	50 watts	LOW 10 mins.	20 watts
	OFF 10 mins.	00 watts	OFF 10 mins.	00 watts
	Total	150 watts	Total	120 watts
			SAVING	20%
PRUNES on 1200 watt units	LOW 60 mins.	300 watts	MED. 30 mins.	150 watts
	OFF 60 mins.	00 watts	LOW 30 mins.	60 watts
	Total	300 watts	OFF 60 mins.	00 watts
			Total	210 watts
			SAVING	30%
SAVORY ROAST AND VEGETABLE DINNER on 2000 watt units	HIGH 16 mins.	533 watts	HIGH 16 mins.	533 watts
	LOW 2 hrs. 15 mins.	1125 watts	LOW 2 hrs. 12 mins.	450 watts
	Total	1658 watts	Total	983 watts
			SAVING	40%



RANGE BEAUTY . . . UNDREAMED OF COOKING CONVENIENCES . . . SENSATIONAL ECONOMY . . . AND PRICES TO FIT EVERY BUDGET

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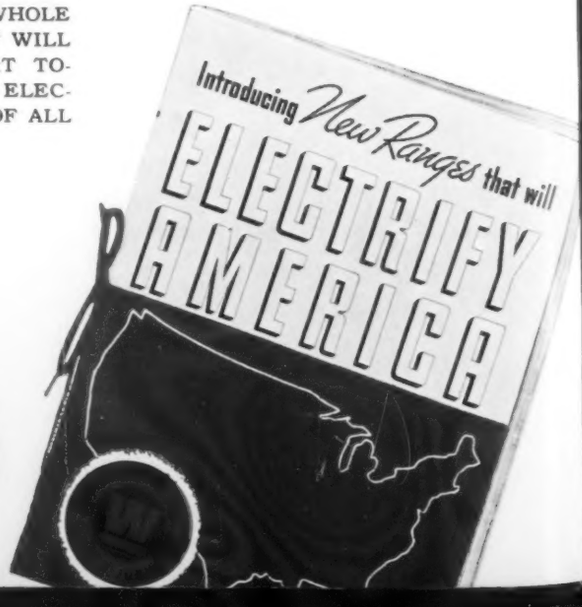

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January 1936

What Makes An "Anti-"?

By H. A. LEMMON,
Sierra Pacific Power Company

OF the fifteen families in the three blocks, numbered from 700 to 900 inclusive on Washington Avenue, ten signed a petition demanding municipal ownership of the electric utilities. Five declined.

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Of the five, the laundryman refused because he was born and raised in France and in his younger years had lived in an atmosphere of government-managed railroads; therefore, is utterly opposed to government operation of anything. The piano instructor had personal reasons. The communist butcher withheld his signature, notwithstanding he hated all privately owned public service corporations, because he is equally opposed to ownership by the municipality; he insists, instead, on Federal ownership and operation. The travelling salesman occasionally sells supplies to the purchasing agent of the electric company and, beside, in his varied travels he has changed his mind about the New Deal and now is opposed to the whole mess—that is, confidentially. The telephone official had thought the general idea splendid until recently, when Congress began an investigation of the Bell Company. What formerly had been more or less remote and academic suddenly came home to him. The telegraph editor refused because his paper was strenuously opposed to municipal ownership; not at all because it loved the serving company, but because it shuddered even at contemplation of turning such a vast sum of money over to the hands of a city council which it termed incompetent and lacking in integrity. However, in the sanctity of the voting booth he probably would vote "Yes." The employees of a newspaper are usually opposed to the policy of the paper paying them wages which are the highest of the semi-skilled occupations.

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The reason why signatures *did* appear on the petition were varied, and complex and multitudinous. Having acquired well-defined prejudices at some time in the past, every current day now adds its own additional confirmation to preconceived ideas.

The clothing merchant, the shoe merchant, the garage owner and the insurance agent all had, in addition to their homes, offices or places of business. At his office the insurance agent pays a bill at the rate of 6½ cents per kw-hr.; at his home he pays a bill with an average of 3½ cents per kw-hr.

The differential between the "commercial" and the "domestic" rate was slightly less for the other three in this group but not enough less to cause them to entertain any different views of what they feel is an injustice. All want to know "why." Peaks? Greater cost of serving commercial customers? Maybe. Seemingly the company does get away with its answers—after a fashion. But is it possible that its theories were fixed in an era when load factor conditions were different than now?

Talks of peaks and investment costs, if glibly proclaimed with an air of conclusiveness, tempered with a proper dash of thinly veiled compassion for the customers' ignorance, frequently cause him to abandon any effort to meet the rooted arguments. Still, silence does not always imply assent.

Over half of the petitioners have been customers of the utility company for ten years and more. At some time during that period all but one of the fifteen had had irritating contacts, or experiences, with the company. More than once each of seven had had his bills jump unexpectedly and without seeming reason. Perhaps this had been a case of an over-read meter. But in only two instances had the company itself caught the error. The other five had had to make the trip to the office of the corporation and when they arrived there they were shunted from the cashier to the complaint clerk, then to the accounting department, and finally got adjustment with what seemed to be reluctance.

Nearly always, minor officials indicated their impatience that the customer did not understand that an over-read meter would correct itself at a subsequent reading. In no case did the company immediately offer to change the billing or to immediately return the excess cash, if it had already been paid. The claim that an over-read meter would correct itself was not convincing to the customer, who generally felt that the public service corporation had tried to put something over on her.

Other sudden and unexplained jumps in the bill were not unusual experiences. Complaint clerks, without adequate investigation have been known to readily acquiesce to the customer's tentative suggestion that the meter must be running fast. To the incompetent representative of the company this seemed to be the easiest way out—passing the buck. So the meter was ordered in for test. Invariably such test was reported as having established the integrity of the instrument and left the customer with a conviction that in some unknown way, he was a victim of corporate greed and utterly helpless against the machine.

Rarely had anyone representing the

This is the second article on public relations by H. A. Lemmon, the first having appeared in the March, 1935, issue under the title "Human Nature—A Puzzle." Early in 1936 a third article entitled "Very Small Keys Will Unlock Very Large Doors" will complete this series in which customer relationship is placed under the microscope.
—The Editor.

company gone to the premises, sat down, talked it over, and made a real effort to assist the customer herself discover the reason. Sometimes a sympathetic and competent interviewer will help refresh the memory of a customer who may suddenly recall that during the month in question certain things had happened to justify seemingly abnormal consumption.

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Many years ago three of the petitioners had moved into the city from other states. They had had the experience of the confusion of establishing themselves in their new homes. As late afternoon approached suddenly they remembered that the lights were "not turned on." A call from a neighbor's 'phone brought the information from the company that the "applicant" must go to the office in person, make "application" or "sign up" as the clerk termed it; then, and only then, after a deposit had been made, would a cut-in order be issued and routed through the operating department—which in due time would make the connection.

Although it was late in the afternoon and the operating department men were out on similar jobs, it was quite certain they could be reached in time to insure lights that night. "Yes, one thing on which this company prides itself is its devotion to service." The customers had waited and finally at the last moment sent little Johnny or little Mary to find a neighborhood grocery to get candles. The customers believed the intimation that lights probably would be available was false. The officials of the company knew that they would not be and the implied promise and hope extended was merely a "stall." It was irritating—just another case of passing the buck.

To call the new customer an "applicant" and his request for service an "application" is, at least, psychologically obnoxious to any standard of commercial decency. As well call the customer a "suppliant" as an "applicant." The fact that the utility clerk considers him an "applicant" and further, the fact that the customer is unwittingly placed in the position of being a "suppliant" tells a long and important story to those who will read and ponder. The horse and buggy days are not entirely of the past. And in passing, why "consumers" instead of "customers"? Is it possible that the utility and its employees do not think of them as customers? Sometimes it would seem so.

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Four had had the experience of having to pay a minimum charge when their houses were closed during vacation. Oh! yes, of course, the rate department can justify a minimum charge under all circumstances, but they didn't believe the president of the company paid a minimum charge to his grocer during the month he was on vacation and did not buy any groceries. What is more, they didn't believe he would pay such a charge even if it were billed. He would change grocers. Yet there isn't a single dramatized factor which is stressed and which is vehemently alleged to be peculiar to the light and power business which isn't equally compelling or sacred in the grocery business, in conducting a barber shop, peddling milk, or even in the operation of a two-chair boot-blacking business.

Two had had the experience of finding themselves without service at criti-

H. A. LEMMON

cal moments. One of them, when her electric range ceased to function just previous to a party which to her was very important, frantically called the company. They wanted to know if the neighbors' lights were on and then if her own were on. They were. In that case the trouble was undoubtedly in her own home and was not that of the power company. What should she do? Well, it was suggested that she call an electric dealer.

Thumbing over the yellow pages in the telephone book she finally found one. Yes, he would send a man out to see what was wrong. But when he got there it was all but too late and guests were already arriving. The "man" turned out to be two men and a truck, because of union rules, and it being after hours there must be a charge of overtime. The trouble was a blown fuse. The dealer charged her 25 cents for the fuse and $1.50 for his efforts. She felt that it was robbery—it took but three minutes to locate and correct the trouble—and she then and there resolved that she would never again patronize that particular dealer. And yet he had lost money in answering the call.

From the feminine viewpoint the party was ruined and the power company (justly) was to blame. She hated the circumstances which spoiled her party, and it was so important!

It seems there are still power companies whose "rules" supercede thought of kindly service; who still think they are selling kilowatt hours; who do not even think in terms of any other commodity in which they are dealing.

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One only of the entire fifteen even pretended to understand the bill rendered, any more than the patient understands the items recorded on the doctor's prescription. Some admitted that the bills were probably correct and they took them on faith. It is a fundamental phase of the many vagaries of human nature that the normal man and woman resents anything he or she cannot understand, if it touches himself or his affairs.

For forty years, more or less, electric companies have been billing customers. If, after all that time only a percentage of them understand the parts which make up the total charge, it would seem there necessarily must be something wrong with the method.

Businesses which are not entrenched behind the wall of monopoly are constantly changing and improving their routine to effect simplicity and understandability. For nearly thirty years the electric light and power company has been billing its customers for kilowatt hours consumed. In those thirty years the record fails to disclose a single incident of any domestic customer coming into the sales room and asking to look over the stock of kilowatt hours. Never once has a salesman experienced the thrill that would come to him as a customer waltzed up to the counter saying that she wished to buy a dozen assorted kilowatt hours. And yet, according to the tenets and the traditions of the industry, such is all it has to sell. It would appear that it is dealing in a commodity for which there is no market.

What the customer is seeking to buy and what he is willing to pay for is service, and service only. He or she wants heat, light, refrigeration, comfort, ease, etc.—SERVICE—and he does not care at all whether this service is rendered by kilowatt-hours, by atomic breakdown, the capturing of the sun's rays, or by other heretofore undiscovered methods of accomplishment.

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Three of the ten had inherited their antagonism to the company. When they were little children they heard much talk in the home unfavorable to the light company. The now grownup children with homes of their own do not always remember what was the parental grievance, but are sure it was deep-seated and justified. These had

come down to the second generation like religious and political convictions—*inherited*. Likewise they themselves were unconsciously transmitting them to their children.

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There were over twenty minor experiences, not necessarily compelling in themselves, but nevertheless contributive to the general background. There were but two or three wherein many years ago the meter reader had walked through the flower bed; several which went back to the horse and buggy days when companies permitted location of their meters inside the house, in the kitchen or in the cellar and even in the attic, and meter readers had neglected to clean the mud off their feet to the detriment of the freshly scrubbed floor; four had had dogs which did not seem to approve of the meter reader or of the collector, notwithstanding that in each case the particular dog under discussion was far-famed for his gentleness and congeniality.

Over the years nearly all had had disputes over their bills. All stated that very frequently the collector seemed to have the idea that they were trying to beat the company, although six called attention to the claim that they had records of many years of prompt payment. *Notwithstanding the fact that Mr. Roosevelt was now busily, blithely, and enthusiastically engaged in promoting a new and bigger depression by reason of which they were occasionally obliged to miss payments a month or two, they were repeatedly dunned, harassed and had received several form letters threatening cessation of the service.*

Over half of them had no abiding faith in the infallibility of the product of the accounting department. They had received many bills in which there were palpable errors. True, these errors were corrected when called to the attention of the company representatives, but the customer wondered if they would have been revised if he had not insisted upon them, and how many incorrect bills he had paid in which they had not been detected. Several had tales of two or three months in succession where incorrect bills had been rendered, one after another. (This frequently happens, and by some quirk of Fate it usually occurs to the customer whom of all, the company most regrets.)

The prolonged political depression had brought its own special irritations to a majority. They had had to curtail to a point of distress. Their wages, their salaries and their profits had reached the vanishing point. Everything had gone down in price, except the things they had to sell. Why should the light company not take the same jolt as had they? The bondholder and the stockholder had no right to dividends in such times when they, the people, were obliged to skimp and suffer from a lack of even the necessities. No, they did not know where the company was to get the money necessary to carry on in such an event, and they didn't care. But it could get it! It was a big and rich corporation. Apparently having no pressing financial problems, it probably could resort to magic.

Seven of the ten had bought ranges or refrigerators, or both, from the power company; four were still trying to make monthly payments on these appliances. Everyone of the four felt the usual and natural resentment of a hard-pressed creditor. Strangely enough they had preferred to buy such things from the power company rather than from the dealer because they felt that the company would provide the best devices, but this touching belief in the company's sales integrity seems not to be taken for granted as regards its other transactions. The thoughtful executive may well give some concern to a little problem in public relations, presented by the high pressure sale of major appliances. A very large portion of the so-called human race is not inherently fond of those to whom they owe, or have *to pay, money.*

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One very important fact having to do with utility relations with the public is that over the years much of its "light bill" has steadily increased from $1.50 to $6 or $7 per month. It may be clear to the utility executive that instead of being a "light bill" it is payment for cooking, refrigeration, water heating, laundry, space heating, radio and other services, and is actually in lieu of coal, ice bills, etc. But in the mind of the lady (who after all guides our destinies) it is still the "light bill."

Two mentioned that they personally knew of instances where neighbors had stolen current from the company for years without being detected. When the theft was finally discovered the company did nothing particular about it—perhaps compromised with the thief by making him pay two or three months estimated back bill, but there was no prosecution and, therefore, the culprit seemingly could not have committed any very serious offense after all and is still laughing up his sleeve at how he put it over. He brags about the many dollars his dishonesty netted him.

Among the small companies in the country is one which has approximately 40,000 domestic meters. The courts have decided that its useful investment is about $35,000,000. A careful check and analysis of the complaints from many sources and of all kinds over a period of several months indicate *that in a little over fifteen years every customer will have experienced some unpleasant irritation in his relations to the public service company.* It has been in existence forty years.

Of these irritations and complaints, over 95 per cent are handled (or created) by company representatives averaging salaries of *$125 per month.* If the saying "sending a boy to the mill" isn't a classic indictment of the practices, and the sort of intellectual equipment motivating the industry this sermon should select another text.

Placing the welfare, and in some instances even the continued life of a thirty-five million dollar investment into the hands of "boys" would only occur in a business protected by monopoly and born under a lucky star.

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Of the ten who signed the municipal ownership petition three only really believed in the avowed purpose; the seven were entirely indifferent to its merit. By signing they were only expressing resentment for real or fancied wrongs, many of which they could no longer name specifically. The others were opposed to the company, not because of logic or reasoning but just "because." All believed the rates too high and *would probably retain that belief, whatever they might be.* They didn't understand the rate schedules, and in that respect they were no different from the company employees themselves. The industry generally doesn't understand them either. They didn't have much confidence in the Public Service Commission; they couldn't see that it ever did anything of consequence for anyone other than the company.

Did they ever ponder over the fact that the total bill for household use of electricity is less than the combined state and federal taxes on gasoline alone, or that since 1929 the tax on private utilities has increased 44 per cent while on farm properties they have decreased about 33 per cent, and that in the end they, the customers, have to pay them. No, they hadn't, and what is more they didn't care.

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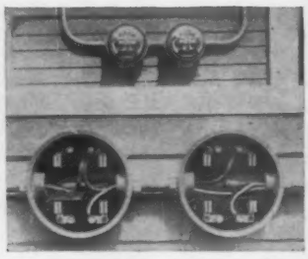
What is service? Just what is it that should be done, or how should it be done, to deliver this intangible thing we so blithely call service. In the electrical industry we sometimes refer to ourselves as public servants; though individually we crave to act more as masters.

A public servant need not be servile and needs to be masterful only in convincing himself and his associates that the company is delivering courtesy and kindness along with kilowatt-hours.

Engineering Symposium + + +

[A monthly forum in which engineers will present and discuss their problems, this department is dedicated to advancing the art of power generation, transmission, distribution and utilization]



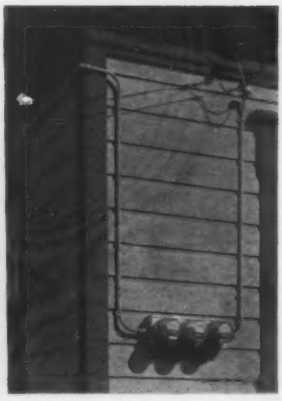


Fig. 2 (left) is the picture of a single meter installation, using only one opening in the base. It will be noted that the service runs to the meter, and returns through the same pipe, to the house wiring. Where the wiring is exposed at the top of the pipe, the hot wire from the service to the condulet and from the condulet to the house wiring, is run in flexible tubing; this, with the use of drive screws, which makes it impossible to remove the cover from the condulet, renders the job tamper-proof.

Fig. 3 (center) illustrates an installation where two meters are connected to one service, showing the connection through one socket to the other. This scheme is limited to two meters. Fig. 4 (right) is that of an installation of three meters set on one service, using the standard troughs with ring sockets

Low Cost Sequence Metering

Changeover of existing meters to socket type of new sequence installation feature of program to prevent current diversion. Group metering as well as individual changeovers made at low cost

By W. H. TALBOT
Supt., Electric Meter Dept.
San Diego Consolidated Gas & Electric Co.

Diversion of electric current while not unknown in the past, grew during the recent depression to such proportions as to warrant giving special attention to its detection and prevention. The San Diego Consolidated Gas and Electric Company is using the following methods as a means of discovering current diversion:

1. An examination of customers' billing for suspicious or unusual variations in consumption. This procedure, checked with other available information concerning the connected load, appliances used, etc., furnishes a surprisingly accurate list of possible suspects.

2. Inspection of customers' premises by meter readers and meter service men in connection with their regular duties.

3. Information received incidentally through other company employees, from individuals outside the company, and from those actually caught practicing diversion. The value of these sources varies greatly with local conditions, but active, enthusiastic co-operation by the entire company organization greatly increases its effectiveness.

4. The employment of special investigators and inspectors. This is a very effective method; though involving substantial expense, the results have more than justified the cost.

When the diversion is discovered, the following means are used to correct and prevent its future occurrence:

The service is disconnected on twenty-four hours notice, unless special circumstances exist in which this action would result in great hardship or damage. The customer thus disconnected can secure resumption of service only by paying an estimated back billing and the cost of rendering his service and meter tamper-proof.

In pioneering the problem of electric current diversion and its prevention, or mitigation, the company had, necessarily, to take into consideration climatic conditions, which in this territory differ widely from those of most other sections of the country.

Fig. 1 shows the crew and truck, with equipment of ladders, small horses for holding the tubing while it is being cut, and the supply of fittings and meter bases. These are carried in separate compartments, arranged so as to be easily accessible from the outside of the truck

Over ten years ago the question of meter locations was discussed with the City Electrical Department and the contractors of San Diego, and it was decided at that time to place all residence meters in standard meter boxes, on the outside of buildings; this change was made about 1922. A large percentage of the diversion that has been discovered, was on premises where meters had been installed prior to that time, on back porches and inside of houses. Another rule which has been enforced is that, in buildings where more than one meter is required, all meters shall be located at a central point in or on the building. This makes it more difficult for the customer to alter his meter or wiring without being detected.

In the past to determine the type of meter best suited to the installation, taking into consideration the advisability as to whether the meter should be installed in the open, on the outside of the building, or in a box as was then our practice, the company has tried out each new sequence type meter as it came on the market. With the consent of the City Electrical Inspector, these have been installed in the open ahead of the main line switch. The socket-base plug-in type meter, which is weather-proof, seemed best suited to the requirements of this territory.

After months of intensive research by Byllesby Engineering and Management Corporation and its properties,

into the problem of electric current diversion, the parent company, on August 4, 1934, instructed its subsidiaries to formulate plans for converting existing obsolete installations to socket-base plug-in type meters and tamper-proof wiring, retiring the old meters from service. The following outline was adopted as a standard program for the San Diego utility:

Every new meter installation, within the capacity available, shall be of the socket-base plug-in type. Every existing meter installation which is substantially rebuilt, either because of detected current diversion or for other reasons, shall be converted to socket-base plug-in type.

In both of these cases it was further understood that conduit would be run to the meter from the point where the service wires first attach to the building, and this run would be unbroken.

For the present, the company proposes to continue the use of open service wires. This is because few diversions occur at the point where the service attaches to the building, and for that reason concentric service cable was considered unnecessary. However, it was decided that, in cases where the service location renders the zone between the meter and the service connection on the outside of the building vulnerable, a special conduit head to permit running concentric cable from the pole to the conduit installation on the premises in a tamper-proof manner and conforming to code requirements, should be used.

Another factor entering into the program is that of running the new conduit service feed from the point where the service attaches to the residence to the meter location, moving the entrance switch to a point on the customer's side of the meter, so that this feed will be unbroken. The obsolete meters, as a rule, are installed on the oldest (and therefore the most vulnerable) installations, few of them having conduit entrance runs. In fact, where there are such entrance runs in conduit, it is now the practice to postpone the change, concentrating on those which are in open wiring. After a thorough investigation, metal tubing was selected for this purpose, as its cost compares favorably with that of conduit and the labor cost for installing is much less.

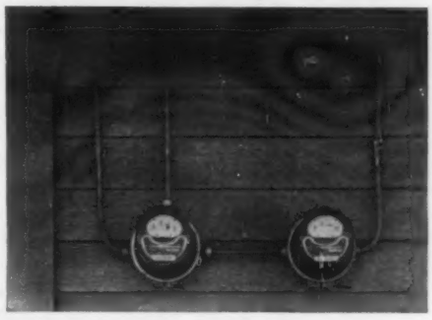


Fig. 8 shows a job in which use was made of service entrance cable. This scheme works to good advantage where there are a number of bends to be made in running the service to the meter and from the meter to the house wiring

A definite program for the progressive conversion of existing meter installations to modern, theft-proof construction was worked out for inclusion in future construction budgets; concentrating upon those localities or individual cases where diversion is most prevalent or where existing construction is most assailable. Approximately eighteen thousand of the older type meters are to be retired from service and replaced with the socket-base plug-in type at the rate of 4,000 per year.

It was decided to change all General Electric type I-16, and Duncan MD meters to the socket-base plug-in type, using the necessary conversion parts. These meters are being converted as rapidly as one hundred or more of them accumulate in the shop, after having been removed from the customers' premises for the ordinary reasons, such as tests, adjustments, etc. The older meters, such as type I-14, presented a special problem, as they come into the shop in large numbers, due to the increasing volume of building alterations in our territory. It was first proposed to install such meters in standard metal boxes, but after several different arrangements were tried, and costs compared, it was finally decided to convert the I-14 meters to socket type. This work requires the services of a mechanic, who dismantles the meter; after which the base is delivered to our machine shop, where it is cut to fit the meter element. The meter is then reassembled by the meter shop mechanic, tested and placed in service. This can be accomplished for a surprisingly small amount.

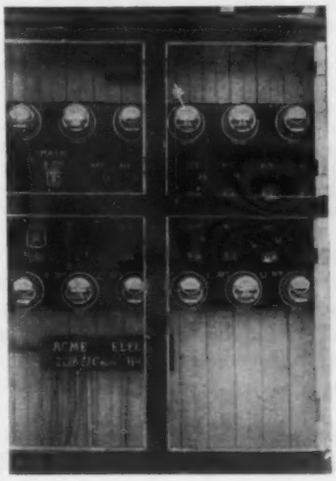
Older districts of the city have been selected in which to make the installation changes on the consumers' premises. A crew, composed of a foreman, driver and four installers, was started on this work March 1, 1933. Up to Oct. 1, this crew has changed 1853 jobs. The foreman inspects all installations in the pre-determined district, and where he finds an older type meter, lays out the work for execution by one of his crew. An interesting feature entering into the work is that the foreman is confronted with all kinds of situations and has to be very diplomatic in dealing with the customers. Where there is any suspicious action on the part of the consumer, the foreman orders the meter changed, regardless of existing type, to the standard sequence job and in these instances something wrong usually is found in the wiring.

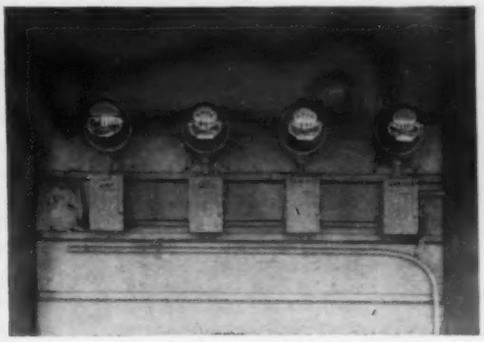
Our program for the conversion of old type installations to the modern socket-base plug-in type meters and new sequence wiring is receiving the full co-operation of both the City Electrical Department and the Contractors' Association of San Diego.

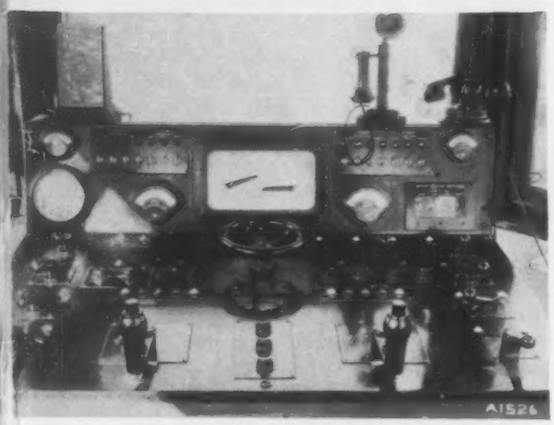
Fig. 5 (left) depicts an inside job where a number of meters are required and large size service is necessary

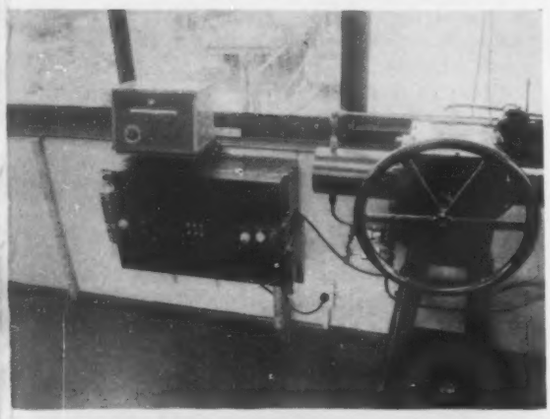
Fig. 6 (center) shows a group of meters installed on a service, using the three opening bases. This job is convenient where the space is limited

Fig. 7 (right) is of a five-meter installation, using the standard meter troughs with ring sockets









Top—General view of the double-leaf, bascule-type bridge spanning the estuary between Alameda and Oakland, Calif. Below—Operator's control desk on the Alameda side, showing, in addition to the usual control and indicating lamps, the selector switch by which various operating combinations of the propulsion equipment can be obtained to insure absolute reliability in the bridge operation. Note the microphone at the left through which the operator can address traffic and ships on the public address loud speakers located above the roadway and on the control house

Modern Bridge Control

REPRESENTING advanced practice in control applications for bridge operation, the new double-leaf, bascule-type bridge across the estuary between Oakland and Alameda, Calif., should set new records of operating reliability and traffic safety. From the construction standpoint, the location of the huge counterweights at each end of the span *below* the surface of the roadway instead of above as is the usual practice has resulted in a more graceful structure. Propulsion through driving pinions engaging in exposed racks on the main longitudinal members also is of interest. In operation, the pinion drives the leaf about a pivot. The shore end of the leaf, mounting the counterweight, drops into a huge water-tight caisson-like chamber extending well below the surface of the water when the bridge is open. This arrangement permits the use of a stationary machinery room at each end of the bridge.

Propulsion machinery in each machinery room consists of a motor-generator set for converting alternating into direct current for use on the main motors. Two shunt wound, mill type d.c. motors, geared to a common driving shaft are installed in each machinery room. At each end of the common drive shaft and operated by it are a set of reduction gears which terminate in the main driving pinions which, in turn, engages in the racks described above. The direction and strength of the generator field determines the speed and direction of the driving motors. Each main motor is equipped with a Thrustor-operated spring set hydraulic brake which is supplemented by a Clark hydraulic controller for emergency operation.

Under normal operation the leaf motors of the Oakland leaf will receive power from the Oakland m.-g. set and the leaf motors on the Alameda side from the Alameda m.-g. set. However, the control system is laid out for a number of various operating combinations of the equipment. Normally all the controls will be concentrated in the operator's house above the roadway on the Alameda side of the bridge. From this point the operator has control over both spans and the various signal lights and traffic control equipment. However, by means of a selector switch mounted on the control desk, the operator can operate either leaf from either of the two motor-generator sets, the exciters on these sets being so arranged that either can be selected to furnish control power. He can also transfer control of the Oakland leaf to the Oakland control house on the other side of the estuary.

By means of circuits laid under the estuary as hereinafter described, this complete type of control is possible but

View of the steel pipe rack used to carry circuits across the channel before being lowered into position. This rack of conduit was swung across the stream and dropped into a specially dredged channel in less than four hours, a new technique for underwater electrical construction

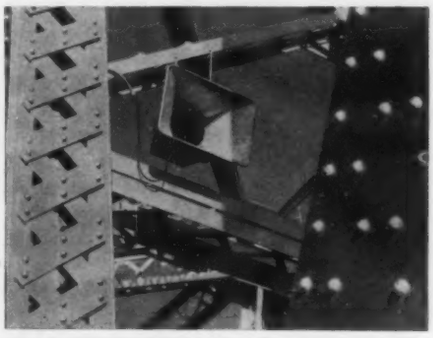
Below is a view of the amplifying equipment for the public address system and the Clark hydraulic controller brake

Bottom—View of the machinery room on the Alameda side of the bridge showing the motor-generator set at the left and the two main driving motors geared to the common drive shaft. The design of the bridge makes possible this compact arrangement of driving equipment

A new flexible barrier of steel cables dropped into position when the bridge is open. The barrier provides increasing resistance to any vehicle striking it after it is lowered. This view shows it stopping a heavy truck which was traveling at 20 m.p.h. when it struck the barrier. Should the barrier strike a passing car while being lowered the steel cable pays out offering no resistance

independent operation of the leaves on the two sides of the estuary is maintained irrespective of a failure of any or all of the circuits connecting the two sides of the estuary.

Continuity of power is assured by providing separate sources of power on each side of the estuary and connected by a circuit under the estuary arranged for automatic throw-over operation in case of failure of either source of power. Control functions for opening and closing the bridge are interlocked to insure their performance in the proper sequence. In opening the bridge it is first necessary to push a button which closes, through a holding relay, a series relay and a time delay relay which operates traffic lights at either end of the bridge to stop the traffic.



One of the public address loud speakers by means of which the operator is able to address traffic or ships

After a definite time delay the oncoming gates may be closed. Only after the light oncoming gates are closed is the special flexible barrier dropped across the roadway. The center lock can then be opened, an operation which permits the opening of the tail locks at both ends of the bridge. After these operations, the leaves can be opened. Another safety precaution in opening the bridge is the provision made through limit switches so that after the leaf has reached the nearly open and nearly closed position it is necessary for the operator to retard the master switch handle to the "off" position and then advance it to the first or second power point in order to complete the operation. If he should advance it further than this, the holding circuit is automatically tripped, forcing the operator again to retard the master switch to the "off" position before power can be applied to the leaf motors. In closing the bridge the various operations described above are performed in reverse sequence with the addition that the emergency brake must be set before the barrier gates can be raised.

Of particular interest is the Alameda side operator's control desk. In addition to the controllers for both leaves of the span the control for all signal lights and traffic protective devices, the operator is provided with a microphone connecting to public address loud speakers through which he can address both traffic and ships passing through the bridge. Also of interest is the manner in which the circuits between the two ends of the bridge were laid under the estuary. Seven 4-in. iron pipes, providing sufficient capacity for all present and future circuits, were assembled on a dock along side the bridge. This assembly consisted of carefully preparing each pipe to resist water corrosion and racking them into the assembly by means of strapped steel clamps spaced at short intervals. When completed, this assembly consisted of a straight length of racking equivalent to the distance across the channel with each end terminating in a 30-deg. bend to bring the ends of the rack above the water after it had been installed. The entire rack was then suspended on two barges, towed into position along side of the bridge and dropped into a channel prepared by dredging. After the pipe had been placed in the dredged-out channel, it was covered by re-depositing dredged material over the top, the conductors were pulled through the piping and suitable terminal boxes installed at either end.

A-symmetric Holophone lighting units illuminate the bridge roadway, being suspended from a flexible connection as here shown, so that they will hang vertically no matter what the position of the leaf may be

The Century Electric Co., of San Francisco, installed the electrical equipment and control which was designed by Romaine Myers, consulting engineer of Oakland, Calif. MacDonald & Kahn were general contractors for the project.

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New Highway Lighting System

Here is the latest fall style in highway lighting as demonstrated by a 1¼-mile experimental installation on a heavily travelled Ohio road. Sponsored by General Electric lighting engineers, this project, to educate the public on the safety of lighted highways, uses lighting units of revolutionary design. Reflectors of a unique shape made with a non-corrosive aluminum finish and powered with 400 c.p. incandescent lamps are installed on 125-ft. centers with a mounting height of 25-ft., extending out over the pavement five feet. The new units are said to place twice as much light on the highway and to increase visibility from 3 to 4 times. Will the day come when America can afford this protection on all its main highways to stem the appalling casualties claimed by night driving?

Silt Erosion Minimized in Plant Modernization

By MAX LLEWELLYN
Engineer, Southern Utah Power Co., Cedar City, Utah

TO combat successfully a serious silt problem on one of the tributaries of the Colorado River, as well as to increase its power plant facilities, the Southern Utah Power Co. recently completed the remodeling of one of its hydro plants by the installation of a new water wheel, generator and miscellaneous equipment.

The company's No. 4 hydro plant is located on the Virgin River, approximately 30 miles below Zion National Park. The Virgin River rises in the mountains some 800 ft. above the floor of Zion and in cutting its way through this picturesque canyon picks up a large amount of silt. Microscopic examination of this silt has shown that a large part of it is composed of quartz crystals of irregular shapes which act similar to emery dust on all metal surfaces it reaches. The hydro station which was remodeled has been in existence only since 1928, but due to the difficulty encountered with the silt-laden Virgin River, it was recently decided to completely remodel the canal system and hydro plant which work has just been completed at a cost or approximately $25,000.

Shortly after the plant was originally installed, a settling basin, or desilting pond, was built near the intake of the canal leading to the hydro plant, but the area of the basin was not sufficiently large to remove all of the sand from the water. A second settling basin has been completed at the point where the water is diverted from the Virgin River, thus making it possible to settle the silt from the river in two stages. The settling basin built on the river consists of a concrete diversion dam across the river, together with a weir above the intake of the canal which backs the water up for a considerable distance in the river bed. The top of the river water is skimmed off to enter the canal system and all heavy particles in suspension in the river water are deposited at this point. An electrically operated radial gate is installed in the concrete dam which affords a means of flushing out the deposited silt at regular intervals. The radial gate can be operated by remote control from the power house some two miles farther down the stream.

From the upper settling basin the water is conducted by means of a short canal to the second settling basin located a quarter of a mile farther down stream. Here a settling basin has been created with earth and rock filled walls which is approximately 300 ft. long by 70 ft. wide, and 12 ft. deep. It has approximately 80 c.f.s. of water passing through it at all times. The settling basin does not have capacity to fully settle out all silt in suspension in the water. Tests have been made since the completion of the sand settling pond which show that approximately 96 per cent of the silt in the river is removed before it reaches the hydro plant.

The experience of the company shows that a long narrow settling basin is easier to operate than a water settling basin with the same capacity which is wider. While the two settling basins are of equal efficiency in settling the sand from the water, the long narrow basin can be flushed out into the river in but a small fraction of the time for the wider basin, and thus decreasing the time the plant is without water. The settling basins are washed out by draining them, using gates located in the down hill stream bottom through which water is rushed at as high a velocity as possible.

Even though a large part of the silt is removed by the settling basins, the remaining portion presents a serious problem to the maintenance of the water wheel runners and nozzles. While the plant would ordinarily be considered in an ideal location for a Francis type turbine, the management believes the maintenance of this type of water wheel would be entirely too high for satisfactory operation.

The water wheel which was recently removed was a four-nozzle wheel operated at a head of 230 ft. and designed to handle 55 c.f.s. of water. The generator was a 400-r.p.m., 2,300-volt, 1,000-kva. conventional type generator. The generator had been purchased second hand by the previous owners of the power plant and never has been able to carry its rated load because of the limited size of the water wheel. In designing the new plant, the company went to a low speed unit and reduced the nozzles from four to two. The unit rotates at 257 r.p.m. and the generator has a normal rating of 1,250 kva. at .8 power factor.

By reducing the speed of the water wheel and reducing the nozzles to two, each bucket passes through a jet but slightly more than 500 times a minute, where previously the old buckets passed through a jet 1,600 times each minute. No definite tests have been made by the company or the water wheel manufacturer to show the relationship between the number of times the bucket passes through the jet and the length of the life of the bucket, but experience has been that this is a very important factor in the maintenance of water wheel buckets under bad silt conditions.

By lowering the speed of the unit the diameter of the wheel was increased, thus making it possible to put more metal in the wheel and greatly increase the runner life.

Prior to the purchase of the wheel, the company had made several tests with various types of bucket material in order to determine the material best suited for this type of installation. Finally in 1932 a material was found which seemed to be most satisfactory. The runner is made of an alloy steel containing manganese, chromium, and molybdenum which has proved to be quite tough, but not very brittle. It is of fine texture, and not readily susceptible to pitting, such as developed where a high carbon steel was previously used.

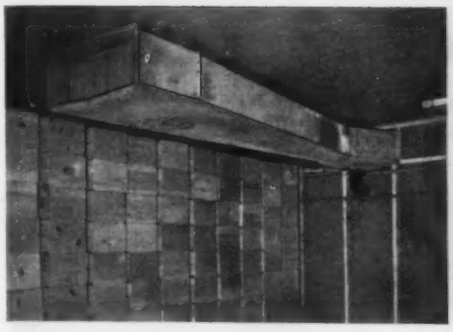
Metals of extreme hardness had to be used for covering the wearing parts of the nozzles and governor operated deflectors. In designing the wheel special care was given to afford easy replacement of all wearing parts. All possible bearings were placed outside the water box and shielded from the silt-laden water. Needle points and nozzle bushings were designed so they could be removed quickly and so that the replacement parts would be as inexpensive as possible.

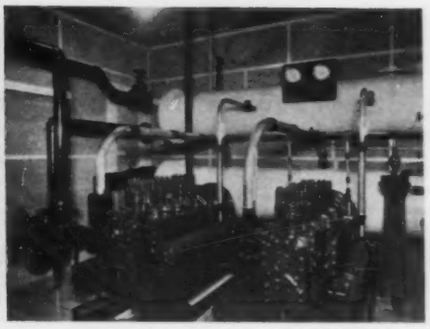
The unit has been in operation for but three months and there is no definite information available regarding the success of the new design, but examination of the wearing parts indicates that the design will be highly successful. With the original wheel replacement of some of the wearing parts was found necessary within three months of the time of installation, whereas for the new wheel no parts show any appreciable signs of wear during this period.

Spends To Save

To reduce maintenance costs from silt erosion, utility substitutes waterwheel having larger diameter and running at much lower speed. Special alloy metal used in new equipment also checks damage from silt laden water.

—The Editor.





(Left)—A section of the lemon storage room showing one of the spray draft humidifying cooling units and (right) two Westinghouse condensing units for conditioning the air circulated through the air ducts. Units are mounted on springs with flexible connections to headers, etc. The oil separators are shown to the right of the condensing units

Lemon Pre-Cooling Plant Saves Losses in Storage

An outstanding air conditioning installation, providing unusually close temperature and humidity control for fruit precooling, has been installed at the LaVerne Lemon Growers Association, La Verna, California, by the Gay Engineering Corporation, of Los Angeles. Completely automatic, the plant of 100 carload capacity is designed to maintain a constant temperature of 57° and a constant humidity of 90%, which is the condition found best suited to preserve the weight and quality of the fruit.

Equipment consists of two Westinghouse air conditioning units connected to a common condenser and flooded type of evaporator. The plant is interlocked with a fan control and outside air damper so that some of the outside air can be used to maintain inside conditions, as there are times when the outside temperature and humidity are such that it is not necessary to run the refrigerating equipment to obtain the desired inside results.

All of the equipment, including the outside air dampers, is completely automatic, being controlled by thermostats, humidistats, etc., to take advantage of natural climatic conditions and also maintain the desired predetermined inside temperature and relative humidity. Graphic temperature and humidity records show that constant conditions are maintained. The operating cost due to the design is exceptionally low, the maximum monthly bill for the year being $62.99 for 7790 kw.-hr.

Of particular interest is a special air conditioner developed by the Gay Engineering Corporation termed the spray draft humidifying cooling unit. There are a number of these units suspended in various parts of the storage room, connected to a supply duct for air. The water from the refrigeration plant is sprayed through the nozzle which controls the temperature of the air as well as humidity and also creates a natural air circulation through the spray draft units. During low wet periods, it is not necessary to operate the fans for the circulation of air, inasmuch as the spray draft units set up their own air circulation.

Both compressor units are mounted on spring supports, the discharge and suction lines being connected with flexible tubing. The oil equalizer connection between the two compressors is also provided with flexible tubing so that the compressors can float freely on the spring supports. An oil separator, operating on the percolator principle, separates the oil from the liquid Freon in the evaporator and returns the oil to the crank cases of the compressors.

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Long Spans Used on Ariel-Longview Line

The recently completed transmission line between the Ariel plant of the Inland Power & Light Co. and the Northern Substation near Kalama, Wash., presents interesting construction features new to the territory. Of the convention two-pole, H-frame type of construction, the line is unusual in that the very rough country traversed permitted the use of a number of long spans and enabled the designing engineers to deviate somewhat from usual practice.

It was decided at the start that the use of high-strength conductors would prove most economical so several types of high-strength conductors were laid out on the line profile and an analysis made of sags, working and maximum tensions, conductor swings, the probabilities of vibration and the over-all cost. As a result of this study the conductor selected consists of six strands of No. 8 copper and one strand of No. 8 Copperweld, the equivalent of No. 1/0 copper in conductivity. The conductor has a rated ultimate strength of 5,960 lb. and the tension, under maximum loading conditions of ¼ in. of ice and 8 lb. of wind, is 3,250 lb. or 55 per cent of the ultimate. Unit stress in the copper strands under normal temperature unloaded is approximately 15,000 lb. per square inch.

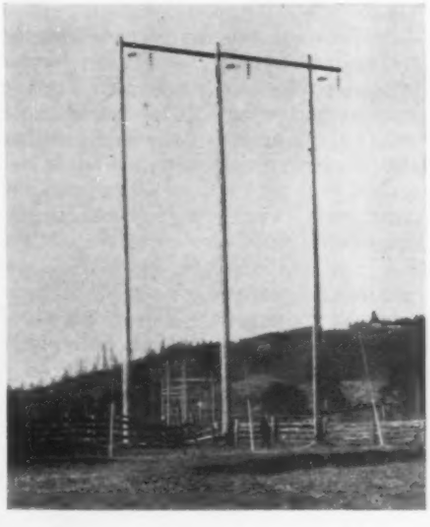
Also of interest is the fact that the installation consists of four 10-in. Pyrex disc insulators for an operating voltage of 66 kv. but spacing is suitable for later operation at 110 kv. This is one of the first major installations in the West where this new type of insulator has been used.

Conductors are spaced 11 ft. 6 in. apart on standard suspension structures up to a maximum span of 1,500 ft. Spans above this length are deadended on three-pole structures with conductors spaced at 16 ft. The average span length of the line is 907 ft., the maximum span being 1,920 ft. long. Over 25 per cent of the spans are in excess of 1,200 ft. in length.

Lightning protection consists of pole ground wires spaced approximately 2,000 ft. apart and spill gaps at each terminal. No arresters or other lightning protective devices were employed.

The line was built for the purpose of disposing to the Washington Gas & Electric Co. some of the surplus energy available from the Inland company's plant at Ariel. The energy sold will supplement that generated by the Washington Gas & Electric at its Longview steam plant. Construction of the line was completed in two months time despite the fact that the rugged country prohibited the use of tractors or trucks along the line, thus making it necessary to resort to hand labor for practically the entire distance of 16 miles. Construction was under the supervision of C. S. Knowles.

Typical long span or large-angle framing on the new transmission line from Ariel power house to Kalama substation. Long spans, high-strength conductors, Pyrex suspension insulators are features of the installation



Plow Up and Pay

"DEMOCRACY," some wit remarked, "is the divine right of mankind to make a mess of things." It would seem, in the light of recent events, that we are exercising this "divine right" just a little too freely. I speak particularly of our government's attempt to control business and agriculture, and of our more recent social experiments.

We do not doubt our government's sincerity of purpose in its attempt to improve the lot of the great mass of people, but we cannot help wondering by which path we are being led to this Utopia, and how many of us will fall by the wayside in reaching there. I am tempted to believe that if some distantly removed and disinterested person were to review the facts, he would be forced to conclude that we have a bad case of national insanity.

MANY of our national acts appear to be the most utter folly. If you had a large family and some of them were underfed, would you plow up the potato patch just because you were too ignorant to devise some means of getting those potatoes into their mouths? This is exactly what we are doing today and in a national way. With millions underfed, we are plowing up the potatoes, destroying the cotton, and slaughtering the hogs. If there is any rhyme or reason in that, I cannot see it. And neither can Electra, which makes it unanimous.

And even if you did concede that the proper way to help our present farmer was to reduce his production and so increase prices, how in the world could you justify our many attempts in other portions of the country to increase agricultural production? I refer to our great public works projects, our irrigation dams, flood and erosion control and reclamation projects. We are bringing thousands of acres of new land under permanent crop production. Certainly, we are playing both ends against the middle.

Many of our more sociological experiments seem to have been conceived and carried out with this same lack of foresight and without any practical plan. I am thinking particularly of our latest experiment in state socialism, the Matanuska farm colony in Alaska.

A RECENT report by Rex Beach, that popular writer and veteran of Alaskan pioneering days, gives us some interesting highlights on this scheme of rural rehabilitation. Mr. Beach tells us that the plan as originally conceived, was practical and modest in scope. It recommended importing not more than 50 families of experienced northern farmers and to prepare a year in advance for their coming.

With characteristic disregard for the reports of its own investigators, the government sent 200 families to Alaska. Instead of preparing a year for their coming, 700 relief workers, who were expected to build houses, roads, and clear their land, arrived just one day before the colonists.

Some of these supposedly "hand-picked" colonists were never on a farm. Many of them don't know which end of a horse to put the collar on or the part of a cow that gives milk. Four months have passed, and forty families have returned home. The long winter is just setting in. It is estimated that not more than the original figure of 50 families will ever be able to stick it out permanently.

Matanuska valley is rich; it is one of the best farming sections in Alaska. Its season is short and intensive. It will grow fine vegetables and berries, and some grains will mature. Dairying possibilities are good, except that cattle must be fed eight months out of the year.

AS a result of poor planning, the little item of a market for their produce was entirely overlooked, and without a market, they cannot become self-supporting. This is a vast, sparsely settled country with few transportation facilities. The nearest towns, Anchorage, Seward, and Fairbanks, cannot possibly consume the vegetables from 200 additional farms.

The colony is being managed to death: with 160 families left, there are 17 department heads. A capital expenditure of a million and a quarter was expected to cover everything, but the present community center alone will cost that much. Estimates of the total cost now run as high as $5,000,000. If 50 families stay, this is $100,000 per family that it will cost us taxpayers. And that is a plenty high price for rugged pioneers in any market!

This whole experiment admirably illustrates the present popular trend of economically unsound government planning and management. It is an example of the waste, the futility of idealistic social theories. This is the sort of thing that is largely responsible for our ever increasing tax bills. We are riding a vicious cycle, spending one dollar to produce, and two to destroy. Even Electra knows that's not good arithmetic.

BECAUSE Matanuska Valley is in Alaska, Electra did a little research for me (I think maybe she thought it would be a good place for next summer's vacation). Anyway she says the farm experiment is not the only place the tax payers' money is being juggled.

"Look at the Alaska Railroad," she said. "They built it to open up the back country and then they started charging freight rates three to ten times those on roads in the States. If you have quit this electrical business to go to mining, and you picked out a claim near Talkeetna, it would cost you as much to bring your machinery up from Seward as it would to get it from Detroit to Seattle. That's 218 miles as against 2,470. It looks like mountains are not the only things that are high in Alaska.

"I guess its the deficit. The Alaska Railroad has had one so long it's traditional. Did you ever read about the coal fields? Up at Chicaloon they've got coal that the Navy says is 15 per cent better than the stuff they burned before oil became fashionable. And what did the government do about it? They tore up the 16 miles of railroad from the fields to the seacoast. Why that coal could be delivered in Oregon and Washington today $3 a ton cheaper than they get it from Utah.

"Take the poor fish, too——"

"What poor fish?" I asked her, "the taxpayers?"

Cooperation on Parade + + +

[*Forecast of forthcoming cooperative merchandizing activities, and review of activities in progress or completed, a summary of cooperation at work throughout the West*]

High spots of the dealer dinner in Reno—Left to right: Jack Howell of Howell Electric, tells utility men dealers are going to sell lots of water heaters whether they like it or not; old timer Frank Broile, of Nevada Machinery & Electric Co., wondered whether he was a holding company or not, and did not like government extravagance; Henry F. Linnecke, Linnecke Electric Co., spoke on conditions before and after the utility's change of merchandising policy; George Tenney, editor of Electrical West, spoke of significant events and trends in the electrical industry. George Campbell, and H. A. Lemmon can be seen just behind him

Reno Dealers Celebrate Cooperative Sales Success

RENO'S electrical industry, having harvested the fruits of three years of cooperative dealer-utility merchandising, is prosperous. Proof of this statement was revealed when forty-eight dealers and members of the staff of the Sierra Pacific Power Co. held a banquet Dec. 6, 1935, to celebrate the achievement of an average annual domestic consumption of 1,005 kw.-hr., an average electric range saturation of 42 per cent, an average refrigerator saturation of 44 per cent and the sale of 589 ranges and 792 refrigerators during the first ten months of 1935. Total 1935 appliance sales, including radio for the territory of the company, with only 9,460 domestic customers, will exceed $600,000.

That credit for the good business, intra-industry harmony and the cooperative program goes to H. A. Lemmon, commercial manager, was testified to by dealers at the banquet when they presented Mr. Lemmon with a scroll emblematic of the spirit which prevails between the power company and the trade. Stress was also laid upon the support given the program by George A. Campbell, president, and the other executives of the utility company.

Behind these bare facts of accomplishment is a story that proves that cooperative merchandising can be successful. Consider the situation that existed in 1931:

Sierra Pacific Power Co. was actively merchandising all types of appliances. In that year gross merchandise sales were approximately $200,000. The company had 12 appliance salesmen and an office staff equally as large. It sold 399 electric ranges and 285 refrigerators. Range saturation was 22 per cent; refrigerator saturation 23 per cent. Average residential consumption was 885 kw.-hr. It was the biggest merchandising year in the history of the company.

Reproduction of the large drawing and message of appreciation presented to H. A. Lemmon by the dealers of Reno and surrounding territory

There were five so-called electrical dealers in the territory of the company and only two appliance stores. There was agitation for an anti-utility merchandising bill, which was subsequently introduced into the legislature in 1932 (and defeated after passing the assembly).

In 1932 Nevada's banks began closing; building permits and post office receipts began dropping—the depression hit the territory in earnest. And in that year the company announced it was relinquishing to the dealers the merchandising of electric ranges and all other appliances except electric refrigerators on which it had a franchised distributorship. In 1933 refrigerators also were turned over to the dealers.

Today the utility commercial department is a service organization, generating ideas and suggestions, handling complaints and public relations, doing strictly promotional work such as the Better Sight-Better Light activity and selling *nothing* but the company's services. This department consists solely of six people. The record domestic consumption has been achieved without the promotion of electric water heating because the company is a combination gas and electric utility. Its electric range saturation is only exceeded by the Mesilla Valley Electric Co. in New Mexico and the Idaho Power Co. There are practically no TVA appliances on its lines. There are no time payment accounts receivable. It has an average annual income per domestic customer of $45.33. Public relations are good; a municipal ownership mayoralty candidate was recently overwhelmingly defeated. The whole industry is back of the utility.

As for the rest of the industry, there

At the end of the dinner given by Sierra Pacific to thank the dealers for their remarkable selling achievements, the dealers turned the tables by presenting Mr. Lemmon with a large scroll of appreciation. Maynard Stampfli, of H. E. Saviers & Son, is shown reading the inscription upon presentation

are today 26 dealers reporting appliance sales to the company. An accurate estimate places the number of sales people engaged in popularizing electrical appliances at 50. Such intensive coverage of the company's 9,400 domestic customers would be impossible with any other method. For example in Lovelock, a town of 1,200 population, two electric ranges were sold in 1931; last year two dealers, one of whom employs an outside salesman, sold 35. Reno has electrical appliance stores that would be a credit to a city with ten times its population.

The statement was made that "the electrical industry is prosperous." The cooperative program is designed to accomplish just that. Proof that it does is attested by the fact that the fourteen *electrical* dealers in the territory sold 93 per cent of the electric ranges and 72 per cent of the electric refrigerators in 1935. The remainder were sold by 11 other dealers—hardware, chain, furniture and general merchandise.

Four distinct contributions are extended to all cooperating dealers. These are (1) a kilowatt and/or unit bonus on electric ranges, water heaters, refrigerators and space heaters; (2) a wiring allowance for electric ranges replacing competitive fuels (coal, wood, oil and butane) in old residences; (3) advertising cooperation and (4) cooking schools and home demonstration helps.

Bonuses are paid directly to the dealers monthly when sales are made to domestic residential consumers in which electric appliances displace competitive fuels, are installed in new homes or increase the connected load already existing. Domestic residential consumers are defined as customers living in single family dwellings or in duplexes in which the owner occupies one unit. The schedule follows:

1. Fifty cents per kilowatt for each kw. of electric range or cooking device having at least 3 kw. of capacity and wired on a 3-wire, 115-230-volt system. (No bonus is paid when the electric appliance sold displaces a similar manufactured gas appliance).

2. One dollar per kw. for each kw. of capacity of an electric water heater, with the same restriction as in 1.

3. Two dollars for each refrigerator.

4. One dollar per kw. for each kw. of electric space heaters having at least 2 kw. of capacity wired for 230 volts.

A wiring allowance of $35 is paid to the dealer selling, or the contractor installing an electric range having a capacity of at least 6 kw. which displaces a competitive range in any residential consumer's home to which electric service has been connected for at least one year and to which no manufactured gas has been served for cooking for at least six months.

The power company shares not over one-half the cost of any newspaper advertising on copy featuring electric ranges, electric water heaters, electric refrigerators, electric space heaters and announcements of electric cooking

Swept off his feet by the tribute from the dealers, H. A. Lemmon received the scroll speechlessly

schools. The amount of newspaper advertising in which the company shares the cost is limited by agreement with the dealer and is based upon sales results obtained from past efforts with reasonable regard to future possibilities. Newspapers bill the utility's share of such costs directly to the company. Copy is approved by the company.

When dealers desire to hold cooking schools, the company furnishes a home economist and absorbs a portion of the cost, such amount being mutually agreed to before the school is held.

In the Lake Tahoe summer resort area, which is highly seasonable, only the load-building bonuses are paid.

Based upon ten month's operations for 1935, the cost to the power company for the load added has been $9.30 per electric range and $7.90 per electric refrigerator. The unit cost per range is low because such wiring as is required is capitalized (wiring allowances were granted on 52 per cent of the ranges sold in 1935). These costs include bonuses, advertising, radio, administration and overhead, clerical expense, floor and window rental (dealers maintain cooperative displays in the company's offices), and all other costs which might conceivably be included.

There are many interesting sidelights in connection with the operation of the plan. Dealers, through their association, have a code of fair trade practices which is strictly adhered to with the knowledge that a violation might jeopardize the cooperative program. As a matter of fact, the dealers themselves police the situation. There have been no serious complications since the program was initiated. The power company retains the right to modify the plan at any time should it become necessary to do so to maintain the best interests of the industry.

Dealers do a splendid advertising and promotional job; full page newspaper advertisements on electric appliances are frequent; radio also is employed. During the past year there were both newspaper and radio cooking schools. The larger dealers maintain splendid sales organizations with salemen.

One significant fact is that electric ranges are sold at about 10 per cent above the manufacturers' list prices. This gives dealers a more adequate margin and permits them also to absorb the difference between the standard wiring allowance of $35 and the average wiring costs, which are $42.50.

At the banquet celebrating the successful 1935 accomplishment, dealers were enthusiastic in their praise of the program and of the motives which inspired it. Representatives were present from the following dealer organizations: Carson Electric Shop, Carson City; Howell Electric, Inc., Reno; Linnecke Electric Co., Reno; Munk Electric Co., Lovelock; Nevada Machinery & Electric Co., Reno; Portola Mercantile Co., Portola, Calif.; Pittsburg Electric Co., Reno; Robinson-McPherson Mercantile Co., Sparks; H. E. Saviers & Son, Inc., Reno; and Snyder Hardware Co., Yerington.

Table I — Results of Residential Load-Building on the Lines of Sierra Pacific Power Co.

Year	Domestic Customers	Elec. Range Sales	% Range Saturation	Refrigerator Sales	% Refrigerator Saturation	Water Heater Sales	% Water Heater Saturation	Average Annual Domestic Kw.-Hr.	Average Annual Domestic Revenue
1930.....	8,186	294	16.5	296	19.8	...	..	781	$42.53
1931.....	8,472	399	22.0	285	23.0	...	..	885	44.71
1932.....	8,031	353	26.0	393	28.6	...	8.7	923	46.09
1933.....	8,191	390	29.8	291	31.3	50	9.3	893	43.58
1934.....	8,792	431	32.6	365	33.3	18	8.9	923	44.63
*1935.....	9,460	589	40.0	792	44.0	124	9.6	1,005	45.33

* Ten months.

Electrical Expositions Direct Christmas Buying to Appliances

"WE had the amazing attendance of 80,000 people in the four days and five nights of the show. They simply poured in, and with no attempt at exaggeration, I say we surely could not have accommodated any more at the periods of peak traffic. In fact, I'm sure that several thousand never went inside when they got to the doors and saw such a jam. But we asked for it, and were pleased to have such a fine public interest as was shown."

Thus J. Clark Chamberlain, secretary-manager of the Bureau of Radio and Electrical Appliances of San Diego County, described the record-breaking attendance at the third annual electrical exposition of that organization early in December. The exposition was strategically timed to stimulate the Christmas buying urge and to turn it effectively toward electrical gifts. Previous expositions have been held earlier in the year but the experience with this show has determined the board of directors and officers of the Bureau to stage the annual exposition in December each year hereafter.

One exhibitor sold 27 refrigerators as a result of the showing. Fifteen were closed there and the balance within the next two or three days. Similar reports have been given by practically every exhibitor at the exposition.

Another bit of strategy was the withholding of advanced publicity until within a comparatively few days before the show actually opened. This had the effect of giving a tremendous amount of interest to it in one whoop rather than dissipating it over several weeks. The opening advertisement in all three local dailies broke with a full page advertisement announcing an electrical exposition section. With this front page a number of pages of advertisements and publicity stories followed. Handled by Forrest Raymond, advertising superintendent of San Diego Consolidated Gas & Electric Co., the publicity functions of the exposition were many and varied.

Some of the features of the show are worth listing and possibly copying by other groups contemplating expositions. One of the best stunts was a recording studio which was built in the exposition. It was operated by Southwest Broadcasting Co. and in it records were made on the spot and sold for 75 cents. A number of records was given as prizes. "And we had a circus making the winners come up on the stage to make 2-min. records before the entire crowd," said Mr. Chamberlain. "The records were played back at once through the public address system and you can imagine the riot."

Even palm trees can be converted to Christmas trees by ingenious electricians. Decorated by the fire department, this tall palm tree outside the exposition could be seen for miles

Another feature was a drinking fountain operated with an electric eye. It was almost impossible to get close enough to it to get a drink because of the crowds. Also three broadcasts over the Columbia station were made from the stage of the exposition. A program featuring the "man in the street" reaction to the exposition was used both as an entertainment and as a "come on" for those outside listening.

In cooperation with the fire department an artificial Christmas tree was made out of a great palm tree 80 ft. high which stands in front of the pier building in which the exposition was held. The tree was lighted each night and a large neon sign "Merry Christmas" was placed behind it.

The displays were uniformly decorated in the usual Christmas style with evergreen, holly and Christmas lights overhead.

Five hundred dollars worth of prizes was given away as door prizes and awards of one kind or another. Every exhibition booth was spoken for long before the exposition was announced and most of the exhibitors have pledged themselves for the same space for next year's show.

When the exposition closed the hard working committee of the directors and officers headed by H. E. Callaway, president of the Bureau, said that their efforts had been exceptionally fruitful of results and had given San Diego electrical business a Christmas impetus which exceeded even the fine results obtained throughout the world's fair year.

■

San Jose Dealers Made Hay While Sun Shone

THROUGHOUT the territory covered by the activities of the Electric Appliance Society of Northern California, the educational directors, the staff of the Society, the dealer representatives of the Pacific Gas and Electric Co., and the distributors and wholesalers' salesmen worked together to derive from the Christmas market dollar the utmost for electrical appliances, according to Bert Reynolds, promotional director of the Society.

Typical of this activity was the program undertaken in San Jose, Calif., starting Dec. 6 and running through to Christmas. It was a joint activity between the dealers and the Pacific Gas

The large upper deck auditoriums of the municipal pier were jammed to capacity by crowds visiting the San Diego Electrical Exposition

Most of the officers and directors of the Bureau of Radio and Electrical Appliances of San Diego County are pictured here. In the back row from left to right are Glenn Dutton, Harry Flinn, Ben Rogers, Ed Meise and Stuart Ashenberg. In the lower row, left to right, are J. Clark Chamberlain, secretary - manager; Frank Munro, second vice-president; H. E. Brunelle, first vice-president; H. E. Callaway, president; Sam L. Hall, treasurer, and Arthur Francis. Directors missing were W. E. Wendel, Leonard J. Harris, Ralph French and C. W. Kinmore

and Electric Co. in which the dealers' windows and floors, as well as the P. G. & E. windows and floors, were used to display appliances, and in which publicity, advertising and demonstrations were used to promote the electrical idea.

For its part the P. G. & E. reserved its entire floor for dealers to display their appliances. It supplied window and display cards for dealers' windows and floor displays. On these cards it told the story of what reduced rates would mean in the operation of electric appliances. Pamphlets containing a table, showing the savings in the operating cost of appliances under the new rates, were distributed to dealers for their use. These were also given away on the floor at the P. G & E. office. A large cardboard wheel was supplied dealers to be used in their stores. This wheel was so designed that by turning to the name of an appliance the cost of operation of that appliance under the old and new rates could be shown at a glance. Hostesses were trained and salesmen were schooled on the selling of table appliances.

Displays were placed even on the floors of the local banks, tying-in with Federal Housing Administration loans for the financing of appliance purchases.

Miss Bertha Mae Hixson, educational director of the Society, schooled the dealers and sales people in presenting and preparing display tables set up for buffet luncheons.

Bill stickers were used by the company on all bills. Copies of these stickers were provided dealers to use with their own mailings. Large advertisements, sponsored by the Society, were run in the local papers and a tabloid appliance edition of the papers worked up in cooperation with the dealers.

On their part the dealers were to furnish two major, or six minor appliances for display on the P. G. & E. floor or in the banks. They were to decorate a window with electrical appliances and to provide for a display of their own, if possible, on the main floor of their store. They would provide a hostess or have their salesmen trained to demonstrate electrical appliances. They were to run advertisements in cooperation with the Society advertisement and to use in their own space the tie in Society emblem.

With such mobilization it is no wonder that electrical appliances were featured during the Christmas Season just past in a way in which they never had been featured before, resulting in a large volume of sales.

•

Mountain Regions Show Tops All Records

ROCKY Mountain region's Electrical Jubilee, Dec. 2 to 24, probably constituted the biggest, most aggressive and most profitable electric merchandising campaign since cooperative enterprises came into style.

Outstanding feature of the Jubilee was Denver's Electrical Exposition, Dec. 4-7, under auspices of Rocky Mountain Electrical Assn. and Electrical League of Colorado, where 14,841 visitors clicked the gate; inspected exhibits at twenty-five distributors' and dealers' booths; provided audiences at the sound-movie "The Home of Tomorrow" and at Public Service Co. of Colorado's stage presentation of electrical wonders; viewed "Jubilee Jack," adjudged toughest among the hundreds of contesting roosters (for purposes of demonstrating electric cookery as an agency to convert muscular meat into toothsome food); and, most important, deposited admission tickets bearing their names and the electrical appliances they would like to own.

At the Exposition alone, some $150,000 in immediate new business was promoted. This amount was calculated by George E. Lewis, R. M. E. A. manager, on a basis of sales closed and in prospect from preferences indicated on the admission tickets, which were distributed free by electrical dealers (and returned to those firms whose name appeared at the bottom.)

The Jubilee reached such proportions that Governor Ed. C. Johnson of Colorado issued a proclamation designating Dec. 2-24 as "The Christmas Jubilee period."

Denver bankers credited an amazing upturn in F. H. A. Title 1 loans to the Electrical Exposition where the Colorado division of the Federal Housing Administration maintained a booth, exhibiting electric ranges, washing machines, ironers, air conditioning equipment and other heavy duty appliances as available for F. H. A. loans.

Though Denver was hub of the Electrical Jubilee, all of Colorado, Wyoming and New Mexico participated under Rocky Mountain Electrical Assn. sponsorship. Co-sponsor was the Denver Post, which carried many columns of reading material and art. Six radio broadcasts—reaching an estimated 2,000,000 persons; a series of smaller Expositions; thousands of Electrical Housewares Week posters, Give-Something - Electrical - For Christmas window wreaths; bill-head Christmas stickers; and four-foot truck and showcase banners added momentum to the tri-state crusade. Forty-nine towns and cities took part; and 500 dealers, utilities, contractors and distributors, together with their 10,000 salesmen and other employes benefited.

The huge merchandising project was timed to begin with Electrical Housewares Week, all sections of the Moun-

Semi-finalists in the "Tough Rooster" contest at Rocky Mountain Electrical Assn-Electrical League of Colorado Electrical Exposition in Denver. The white leghorn (under the boy's chin at left) won a $10 prize for his owner; and was electrically cooked in a roaster to prove that no matter how tough they come, they still can be softened electrically

tain area launching their local observances simultaneously. This opening drive provided sufficient impulse to carry the Jubilee under a full head of steam until about mid-December when the participating communities were fully organized with Christmas Lighting Contest programs.

Even before the Jubilee activity was over, all interests identified with the movement began planning for a similar undertaking next year—on a greater scale. Also, stimulated by Jubilee momentum and the signally successful 1935 Business Development program preceding it, R. M. E. A. officials projected a 1936 endeavor that will be launched immediately after the first of the year.

•

Chico Dealers Stage First Electrical Show

IN a district in which little or no cooperative advertising has been done by the electrical industry to promote the electrical idea, namely, Chico, Calif., the long standing precedent was broken late last year in the 1935 Chico Electrical Exposition. Its purpose was meant to create a more widespread knowledge of the new electrical appliances through an educational show, and to cement the various interests of the industry, the retailer, the wholesaler and the utility, into a closer bond through cooperative advertising. Incidentally the volume of sales increased materially during the Christmas Season as a result of the exposition held just prior to the Holiday rush.

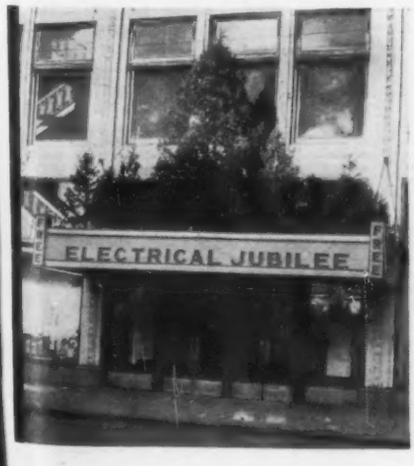
Sponsored by twelve electrical dealers in cooperation with the Pacific Gas and Electric Co., it was decided to hold the show at the Chamber of Commerce building after several general meetings of the dealers. Those participating included: Victor Strain, Clark Hardware, Chico Electric Shop, R. J. Crow, Richardson Furniture Co., J. C. Plummer, Hanson Radio Headquarters, Nichols Hardware Co., W. F. Gage & Sons, Boblet Electric Shop, Graves Radio Service, and Parker Hardware Store.

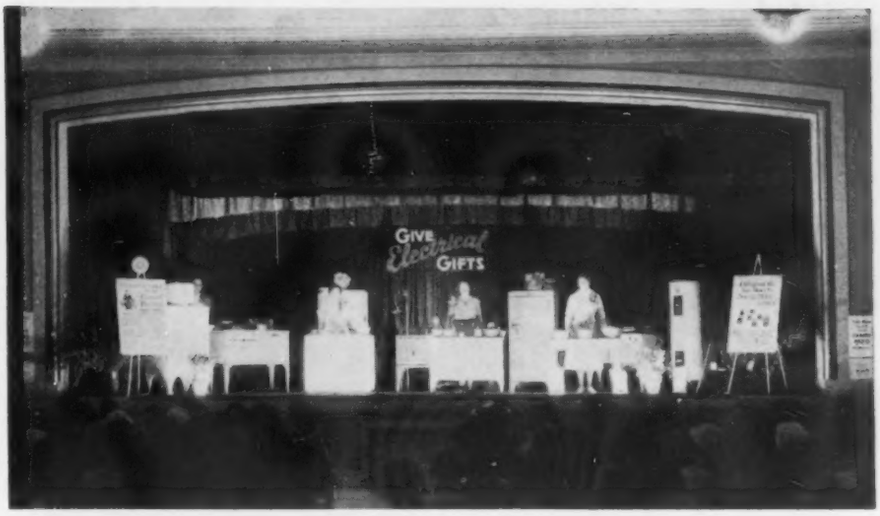
Although cooking and refrigeration schools have been held in Chico, no attempt had been made to hold a general appliance exposition. Space was divided into 10x15 ft. sections at the price of $25 per booth. Twelve spaces were sold, making a total of $300, to which the power company added a like sum, making a budget of over $600.

A general committee and special committees were appointed to handle the various parts of the arrangements; such as the general show committee, entertainment, prizes, cake baking contest, and special invitations committees. A total of 400 column inches of space was purchased by the exposition and divided equally between the Chico Record and The Chico Enterprise. An 80-in. ad ran on the day preceding the opening of the exposition and the remainder of the space using 20- and 30-in. ads was run during the show. Free publicity in the form of stories and pictures was run for a period of 10 days before and during the time of the exposition, the newspapers giving fine cooperation.

In addition to this approximately thirty 50-word spot announcements were sent out over local radio station KHSL. Miss Gladys Byrne, Educational Director of the Northern California Electrical Appliance Society, gave a 10 minute talk on a 15 minute program purchased by the exposition. Fine representation from the neighboring cities of Red Bluff, Orland, Willows, Marysville, and other surrounding towns indicated that the radio publicity gave a wide coverage.

Nearly 15,000 residents of Denver and Colorado attended the Electrical Jubilee Exposition in Denver, Dec. 4-7. The electrically lighted marquee was specially constructed, and spectacular window displays helped lure the crowds





With this brilliant setting of electrical appliances, the people of Chico, Calif., were demonstrated electrical methods of simplifying housework

Approximately 3,000 letters were sent to parents of school children by the Parent-Teacher Association inviting them to participate in a cake baking contest. After the contest was over the cakes were sold by the P. T. A. and the funds realized by them were used for the benefit of undernourished children in the Chico schools.

Each participant had a floor plan showing his booth and instructions as to general layout. In the center of the hall 600 chairs were placed for spectators during the cooking and refrigeration schools and the entertainment provided. An excellent public address system was loaned by one of the dealers, Hanson Radio Headquarters. Doors were open from 1 p.m. to 10:30 p.m. daily.

Cooking and refrigeration demonstrations were given daily from the stage from 2 p.m. until 4 with Gladys Byrne, Educational Director, Electrical Appliance Society, as hostess, assisted by Ruth Conley, home economist of the Pacific Gas and Electric Co. and Elsie Rasmussen, home economist of the Pillsbury Flour Co. Several makes of ranges and refrigerators were used in the demonstrations.

The evening entertainment consisted of a program given by the local radio station on one evening and another program furnished by the Parent-Teacher Association, featuring local youngsters.

Prizes in each case were merchandise orders and electrical appliances displayed at the exposition. In the case of small appliances they were actually given as prizes in many instances. The grand prizes were a Hotpoint range, donated by General Electric Company, and an L & H water heater given by the Linderman & Hoverson Co.

The attendance for the three days was, respectively, 765, 1,800, and 2,400, a total of 4,965 people. Other results directly traceable to the show were the sale within the ten days following the show of three refrigerators, two ranges, one mixer, three lighting fixtures, five electric washers, two radios, three ironers, three floor lamps, five coffee makers, two electric heaters and two vacuum cleaners. Sales were far above expectations of the dealers and many active prospects were closed later.

Wm. R. Bowler, newly appointed district sales manager at Chico, was very active in organizing and promoting the show, having had successful experience with similar shows in San Jose. In reporting on the success of the activity he declared that the purposes of the exposition were well fulfilled, namely, to stimulate the sale of domestic appliances during the Christmas season and to improve the cooperative spirit among the dealers by a tangible evidence of what cooperation could accomplish.

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Facsimile of the large ads announcing the unusual offer to the customers of Coast Counties Gas and Electric Co.

Free!
Electric Merchandise Gift Certificates
to All Electric Domestic Consumers
An "ELECTRICAL MERCHANDISE CERTIFICATE" in the amount of 50% of your electric bill will be presented to all domestic consumers during January, 1936. This certificate may be used as cash for full or part payment on the purchase of any electrical appliance or merchandise listed below, on or before February 29, 1936.
This Is Your Opportunity to Secure Needed Appliances
Credits Apply on the following
Electric Merchandise Certificate
MEMO $20.00 45 CTS.
A reproduction of this gift certificate is shown above. Upon receipt of your certificate, visit your local dealer and choose your appliance from among the accredited list. He will accept it at face value for full or part payment on the appliance of your choice. Usual easy terms may be arranged on the balance. Watch for your FREE GIFT CERTIFICATE, and don't fail to make your selection prior to February 29, 1936.
For Complete Details See Your Dealer or
Coast Counties Gas and Electric Company

Half of January Bill As Appliance Certificate

OFFERING its customers an unusual merchandise gift offer during the month of January, the Coast Counties Gas & Electric Co. inaugurates a brand new idea in load building and dealer sales building.

During the January billing period each domestic electric consumer will receive with the electric bill a merchandise certificate equal to one-half of the charge for electricity. This certificate will be given to the customer to be used as a merchandise order on any cooperating electrical dealer to apply on the purchase of an electrical appliance or upon Mazda lamps. The dealers then may cash the certificates at the local office of the company at their face value less 10 per cent.

In announcing this unusual proposition, H. W. Edmund, sales manager, said, "We believe that alert dealers will take our certificates as down payments on any electric device. We think that the $25,000, which is approximately the amount of the certificates, can easily be tripled."

DEALER SALES REPORTS—OCTOBER-NOVEMBER, 1935

A Summary of the Dealer Reports Compiled by Associations, Societies, or Bureaus, or Dealer Contact Departments of Utilities

APPLIANCE	P. G. & E. Co.[1]		San Diego Cons. G. & E. Co.[2]		San Joaquin Lt. & P. Corp.[3]		So. Calif. Edison Co., Ltd.[4]		Utah Power & Lt. Co.[5]		Wash. Water Power Co.[6]		Idaho Power Co.[7]	
	*Oct. 1935	11 Mos. Dec.-Oct.	Nov. 1935	Year to date	Nov. 1935	Year to date	Nov. 1935	Year to date	Nov. 1935	Year to date	Nov. 1935	Year to date	*October 1935	*Year to date
Ranges	269	2,906	34	309	115	1,357	438	5,162	133	1,769	22	.....	167	2,407
Water Heaters	182	2,191	43	413	69	683	227	2,779	27	413	13	.....	138	257
Air Heaters—aux.	1,519	5,476	178	810	161	315	532	1,642	291	708	320	.....	.....	.....
Air Heaters, 220	141	755	.....	.....	135	645	.....	.....	.....	.....	.....	.....	.....	.....
Refrigerators	2,336	35,798	284	5,669	157	5,768	1,928	33,629	247	7,243	119	.....	148	5,402
Dishwashers	13	93	.....	.....	2	17	.....	.....	1	7	.....	.....	.....	2
Washers	3,298	27,673	332	3,179	440	3,732	2,786	27,632	902	8,418	436	.....	455	3,965
Ironers	1,041	8,578	86	643	74	695	557	4,743	29	389	35	.....	27	370
Vac. Cleaners	2,086	19,907	170	1,584	113	905	1,140	9,761	566	4,454	186	.....	60	710
Radios	8,213	63,982	841	8,751	861	6,180	5,331	43,850	1,929	10,124	1,317	.....	590	3,106
Mixers	1,175	5,616	36	883	99	798	634	4,360	267	2,399	219	.....	74	521
Cookers, Casseroles	.....	.....	38	282	30	191	98	573	20	341	257	.....	6	25
Irons	.....	.....	260	2,959	439	3,886	1,596	14,880	1,125	10,329	508	.....	374	3,329
Waffle Irons	.....	.....	131	1,382	178	1,200	709	4,738	507	2,796	236	.....	98	823
Toasters	.....	.....	152	1,840	209	1,452	822	6,550	707	5,162	966	.....	148	1,272
Table Stoves, etc.	.....	.....	54	524	197	1,469	403	3,266	752	6,946	.....	.....	361	2,352
Heating Pads	.....	.....	88	647	.....	.....	419	2,128	258	1,982	298	.....	58	268
Curling Irons	.....	.....	.....	.....	.....	.....	110	745	280	2,559	.....	.....	.....	.....
Coffee Makers	.....	.....	139	1,360	167	1,118	451	3,963	421	2,713	445	.....	109	1,136
Sewing Machines	943	11,947	16	197	.....	.....	.....	.....	.....	.....	59	.....	.....	.....
Clocks	.....	.....	.....	.....	165	1,041	555	4,287	341	2,608	341	.....	45	261
Fans	.....	.....	.....	.....	.....	.....	48	2,865	10	2,094	10	.....	11	894
Floor Polishers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sun Lamps	.....	.....	.....	.....	4	25	27	275	7	58	5	.....	7	130
Reflector Lamps	.....	.....	.....	.....	194	1,025	.....	.....	1,652	8,805	584	.....	555	1,715
Misc. Lamps	.....	.....	.....	.....	.....	.....	.....	.....	1,928	10,127	1,572	.....	971	2,657
Yard Lights	.....	.....	.....	.....	76	566	.....	.....	.....	.....	.....	.....	.....	.....
Misc. Small Appl.	.....	.....	159	2,193	227	2,181	788	15,137	28	189	.....	.....	.....	.....
Total Dealers	1,400	.....	.....	.....	.....	.....	574	574	.....	.....	.....	.....	.....	.....
No. Reporting	.....	.....	.....	.....	134	143†	518†	507††	.....	.....	.....	.....	.....	.....

* November Report was not available at time of going to press. † Arithmetical average number of dealers reporting since first of the year.

[1] P. G. and E. reports obtained only on major appliances upon which accurate reports are available from dealers' accounts. Ranges, water heaters, and air heaters include company and dealer sales. Total dealers include gas as well as electric dealers. First report of year 1935 starts with Dec., 1934, and will be cumulative from that month.

[2] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Clocks, fans included under miscellaneous.

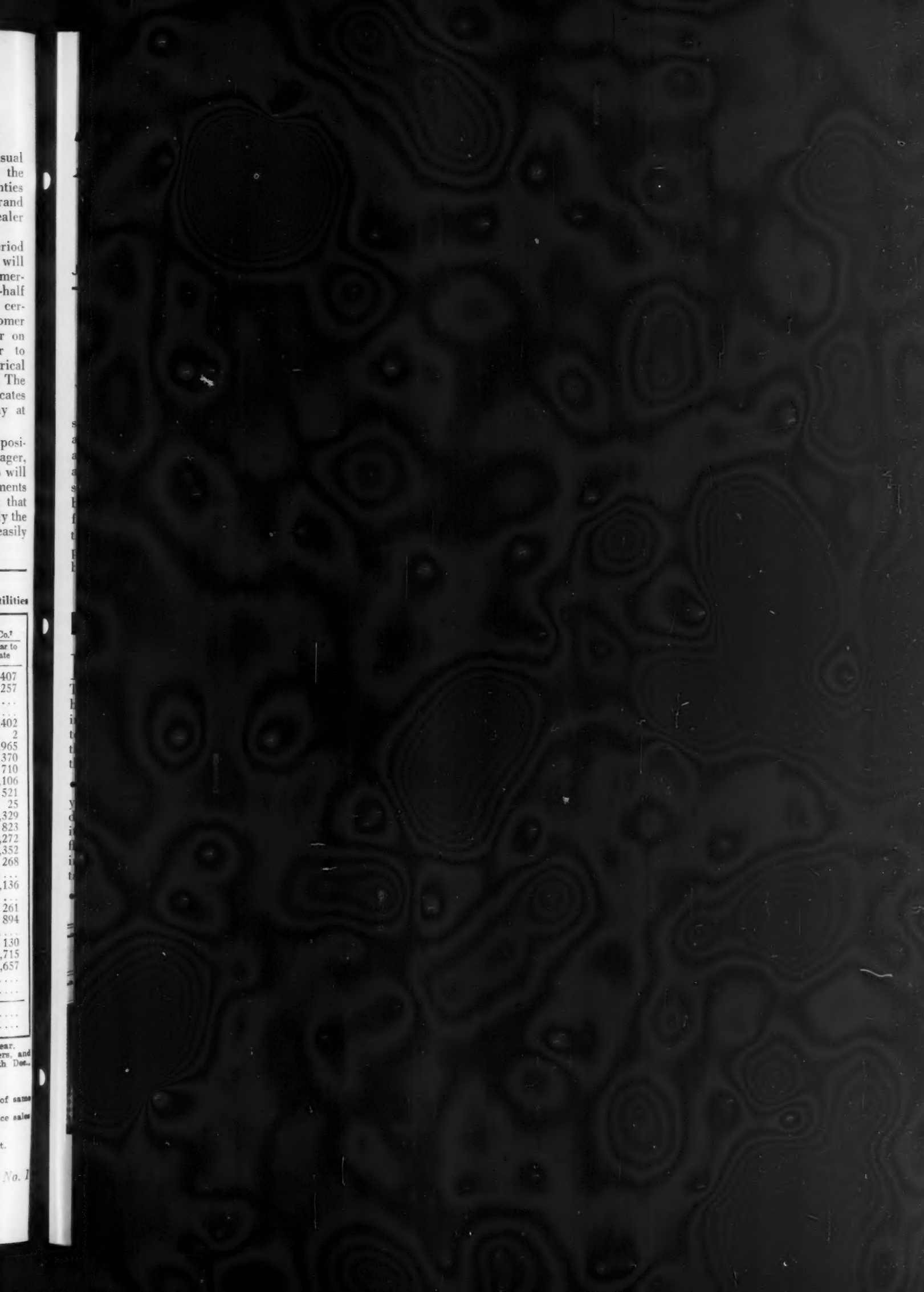
[3] Includes dealer reports from Midland Counties Public Service Corp. territory also. Compiled by Valley Electrical Supply Co.

[4] Includes reports from dealers on San Joaquin Valley system of the company as well as Southern California areas served. Comparative figures of same month last year indicates improvement.

[5] Includes Utah Power & Light Co. territory in Utah, Idaho and Wyoming. Also Western Colorado Power Co. territory. Dollar value of appliance sales in June, 1935, is over 300,000 ahead of sales in June, 1934.

[6] Dealer sales only for Spokane and company's territory. Company sales not included. Table stoves, grills included with cookers.

[7] Figures compiled by Electrical Equipment Sales Association. Include power company sales and sales of all reporting dealers—about 60% report.



ELECTRICAL WEST COOPERATIVE

SALES APPLIANCE ★ GUIDE

JANUARY, 1936 . . .

. . . . Copyright, 1936, by Electrical West, 883 Mission St., San Francisco

Fill in the Chinks With Table Appliances

WISE salesmen and dealers look for lines or specialties that will sell easily and fill in between the major appliance sales. Table appliances make an ideal fill-in between seasons. They are always in season. True enough they sell easier as gifts at Christmas or for brides, but the season is always open for selling the peculiar and special things that table appliances can accomplish for a home, a family, even a bachelor—man or woman.

• EVERYONE is a prospect. There is an appliance that serves every person's needs. A display such as that described below helps to scout out that information, aided by a few tactful questions.

• EVEN THOSE WHO HAVE an appliance are prospects for the new matched sets, or the more modern automatic types.

• THERE'S PROFIT in these table appliances as fillers-in. They help the dealer carry the overhead. To the salesman they offer a chance to make call backs pay—to keep his old customers buying new appliances from him.

• TRY THE TECHNIQUE suggested in this sales guide and you'll find it easy to make table appliance sales. Notice how the stress is all placed on *what the customer can do* with these appliances. Make that your guide and the customers will take more appliances home with them to get these benefits.

Display in a Home Setting to Stimulate Desire to Own

FEW people really appreciate how many ways appliances can be used. They have no idea how useful they can be made with a little thought and imagination. So supply them with ideas as to what can be done. It is just what they need to make up their minds for them.

• YOU WILL SELL MORE appliances if you visualize for them what they can do with the appliance when they get it home. So set up your windows and floor displays to stimulate their imagination. Give them something to imitate.

• SET UP A BREAKFAST TABLE, all set for breakfast, with appliances, dishes, napkins, silver. Placard it neatly. Tell the woman she can set it up like this at night and enjoy an extra hour of sleep on occasions, knowing that her family can get breakfast without a bit of trouble.

• SET UP A BUFFET LUNCHEON, dinner, or breakfast table. It's a smart way to entertain these days, and saves lots of bother serving a big meal. It is ideal for the husband's early golf party, the bridge luncheon, the P.T.A. meeting, the dancing party (that will keep the children home), the after theater snack. Sell these ideas, and they will take home the appliances to accomplish this kind of free and easy living—with electricity.

• MENUS are a clincher. Assemble three or four good, rather simple ones, from the manufacturers' literature and cook books. Print them up, or mimeograph them, to suggest how this electric appliance living can be done so easily.

• ON THE NEXT TWO PAGES is an excellent sales talk. Turn to the fourth page and note how the customer advantages on that list are woven into Salesman Smith's talk. Familiarize yourself with the words and ideas in this guide and you will automatically improve the number of sales you make with table appliances. And if you plant these ideas strongly enough with your prospects, you will stop lots of shopping around, close more sales, at better prices—and profits—even over price competition.

Buffet breakfast spread, for an early lunch before, or a late lunch after the football game. Displays such as this help the prospect to see just how she herself can use appliances in gracious entertaining

SALES TALKS THAT

CASE HISTORY NO. 13 — SELLING TABLE COOKERY

BILL SMITH, master salesman, made a nice profit out of 1935's appliance business. Because he is a good operator, he has analyzed his past year's activities to find out where he can sell still more effectively. Investigation convinced him that he could make small appliances a year-round sales leader because table cookery represents a real convenience to the customer that is yet little appreciated. The local electric company gladly furnished him with the services of its home economist to help him set up an attractive and appealing table to demonstrate table appliances and to bring home to his prospects just how easily meals can be prepared in the dining room instead of the kitchen. Silver, china and foods as well as a coffee maker, a toaster, electric grill and an egg cooker were arranged on the table to prepare a breakfast. His sales talk was built round the ease, convenience and genuine hospitality table cookery makes possible in the home. The weeks following the holiday season are admittedly "slow" but Bill has found his old selling formula works even then. Let's use his sales talk to a Mrs. Brown as an example.

She has entered the store with a toaster to be repaired.

BILL *(pleasantly)*: "Good afternoon, madam, may I be of service?"

PROSPECT: "Yes, I have a toaster here I would like to have fixed. Will it cost much?"

BILL: "If you will wait just a moment I will have our serviceman give us an estimate on it. Excuse me a moment, please."

THE prospect looks around the store and is immediately attracted to the table cookery display. She is standing there admiring it when Bill returns.

BILL: "It will cost approximately $1.50 to fix the toaster. It has been in service for quite some time, hasn't it?"

PROSPECT: "Yes, it has. We use it almost every morning. I suppose you might just as well go ahead and have it fixed for me."

BILL: "Yes, an electrical appliance like that is a pretty essential part of most American breakfasts. I don't know whether you have ever thought of it or not, but the toaster, together with two or three other new electrical appliances, will permit the cooking of a most appetizing and tempting meal right at the table. Table cookery is so easy and convenient that I have often wondered why it isn't used more. That is one reason why we have set up this table to show how simple and pleasant it is to prepare breakfast, and light or informal luncheons and suppers in the dining room rather than the kitchen. Doesn't the idea appeal to you?"

PROSPECT: "Well, I haven't given it much thought, but this certainly is an attractive table. I can see where it would simplify the preparation of light meals."

BILL *(enthusiastically)*: "I am sure that after you had once tried table cookery you would use it more and more. Now, take breakfast for instance, with just these three appliances, the coffee maker, toaster and grill, you can prepare as hearty a breakfast as anyone could desire. If you haven't tried these new coffee makers there certainly is a treat in store for you. Its operation practically guarantees that each batch of coffee will be exactly the same. Because the water is not boiled in with the coffee, all of the fragrance and aroma of the coffee are obtained without releasing any of the bitter oils. Also, after the coffee is made it can be kept hot without getting stronger, because the grounds are not in contact with the liquid. While the coffee is being prepared, toast can be made. This automatic toaster

will prepare each slice just the way each member of the family likes it by adjusting the automatic control for the amount of toasting to be given each piece of bread. In the meantime, you will notice this electric grill which opens up into two hot plates for frying eggs, bacon or hotcakes. For people who like still heartier breakfasts the grill will prepare a small steak or chops equally as well. For those who prefer eggs boiled, shirred or poached, this little egg cooker does the trick without any attention whatsoever. A breakfast cooked right at the table is the most pleasant way to start the day. As a matter of fact, I enjoy getting my own breakfast and after we have been up late Mrs. Smith often leaves the table set much like this one for me while she enjoys the luxury of an hour or so extra sleep."

POWERFUL sales appeal here. Bill proves that a meal can be prepared by reciting a common menu, and cites his own case which shows how table cookery relieves Mrs. Smith of work and allows the luxury of extra sleep.

PROSPECT *(smiling)*: "I would say that that would be one of the strongest inducements for the adoption of table cookery, but really I had no idea that so complete a menu could be prepared with just these few appliances."

BILL: "It is surprising, isn't it, but that isn't the whole story by any means. With these same appliances you can serve a delightful informal bridge tea by using the grill to make those tasty and dainty toasted sandwiches; you can prepare easily and quickly an evening snack of sandwiches or waffles. In fact, you are always prepared for unexpected guests and it is much more pleasant to be a guest at your own party. These appliances permit you to do just that very thing."

NOTICE that Bill is not afraid of using descriptive words to paint an appealing picture in the prospect's mind. He isn't selling appliances as much as he is the service those appliances will render to his customer.

PROSPECT: "I shouldn't think that you could get much of a variety for a bridge luncheon or an afternoon tea with just these three appliances."

BILL: "It doesn't seem possible, does it? But with the help of the home economists of the electric company, we have prepared a little booklet here of tested table cookery menus. *(Here Bill picks up an inexpensive little pamphlet showing various menus possible with the appliances displayed.)* By spending a few minutes in the kitchen beforehand in mixing a salad or dessert in your refrigerator or mixing up a creamed dish to be served hot at the table a delightful luncheon is possible. For instance, take this suggestion for a bridge luncheon: Creamed chicken on crisp waffles, jello-fruit salad, melba toast with assorted jams and jellies, individual ice cream cups and wafers and coffee. The creamed chicken can be prepared beforehand and warmed in an electric casserole, like this one here, the toast, coffee and waffles can be made right at the table. You can sit at the table and enjoy the company of your guests during the entire luncheon. No needless trip to the kitchen, no delays or extra work and, best of all, appetizing food cooked in the modern electrical way that will enhance your reputation as a hostess."

BILL'S idea of preparing a small inexpensive book of menus for table cookery provides another powerful sales tool which proves in the prospect's mind the ability of table cookery to provide a variety of appetizing dishes.

PROSPECT: "This certainly is a handy little booklet. Why is it that somebody hasn't told housewives about table cookery before? I have many friends with beautiful appliances that are seldom used."

BILL: "I agree with you, and I think the reason that most people don't use their appliances is because they haven't been told how to use them as a group to save extra steps, extra work, and a great deal of time. I am sure that any housewife who would take the time to sit down and study the matter would find many more ways of using her appliances and be able to devise a much larger list of menus than are shown here in this pamphlet. Table cookery is the modern way to provide light meals for the family and small, informal social affairs."

PROSPECT: "The idea certainly appeals to me. Ours is a small family and I can see where it would save my time and many extra steps."

BILL has successfully planted in the prospect's mind the convenience of electric cookery, so now he feels it is time to sell her the equipment that will make it possible for her to enjoy this new labor-saving service.

BILL: "I presume you have noticed that one reason for the attractive appearance of this table is the fact that all of the appliances are of the same style. They make a handsome combination, don't you think? Now the toaster which you brought in has seen quite a bit of service and even after it is repaired you probably will be needing a new one some time in the near future. Why not let me send out this new automatic toaster, the new sandwich grill and one of these coffee makers. With this handsome matched set you will be able to enjoy the many advantages and conveniences of table cookery and with appliances which you will be proud to show to your friends."

PROSPECT: "It is a handsome set, but I really couldn't afford it now right after the Christmas Season. I'll wait until sometime later."

HOW does the prospect know she can't afford it? Bill has not mentioned price, therefore he assumes that her objection is merely a stock answer to any sales proposition and proceeds to demolish it.

BILL: "Of course I understand that budgets have been pretty well stretched by Christmas buying; however, I know that you will find many ways to enjoy and profit from table cookery and I really would like to see you start using it as soon as possible. The cost of this equipment is small compared to the convenience, enjoyment and leisure you will receive from this modern method of meal preparation immediately."

PROSPECT: "Well, I think that I'll take the coffee maker, toaster and grill. You can fix the old toaster and send it out with them."

CALIFORNIA OREGON POWER CO. • PORTLAND GENERAL ELECTRIC CO.
MOUNTAIN STATES POWER CO. • PUGET SOUND POWER & LIGHT CO.
PACIFIC POWER & LIGHT CO. • IDAHO POWER CO.
NORTHWESTERN ELECTRIC CO. • WASHINGTON WATER POWER CO.
UTAH POWER & LIGHT CO.

Translate---

Table Appliances into these Customer Services

A Guest at Her Own Table—

Can arrange meals so that she need not get up and down to go to the kitchen. Cooking of major items can be done beforehand, kept just right for serving. Finishing touches of cooking done at the table as served. Makes serving a meal more fun. Hostess or mother need not be left out of conversation or her own party.

Reputation as Clever Hostess—

Can arrange attractive buffet meals that will be talk of her friends. Adds to conversation to point with pride to her "electric servants" that never go on strike or complain. Guests like to see food cooked before them and discuss recipes. Buffet meals most satisfactory, easy way to serve large numbers of guests, especially when they may arrive late, or unexpectedly bring others with them.

Reputation as a Fine Cook—

Food served piping hot tastes better. No danger of forgetting something or letting it burn while serving. Special tasty menus with electrical methods. New dishes and stunts bring reputation for culinary skill.

Added Charm to the Home—

Attractive finishes, new styling, simple detail, matched patterns, tray assemblies, all enhance the home setting. Give a home a modern, up-to-date appearance.

Such Versatile Servants—

Can do so many things with each appliance besides its main purpose. In emergencies serve as extra stoves, warming food or medicines, sterilizing with heat. (Waffle irons can bake cakes, act as a hot plate, make odd shortcakes, etc. Grills and toasters can keep small dishes warm, heat chocolate, etc. A little imagination will discover many other uses for each appliance.)

Less Bother and Housework—

Can cook quickly right at table. Saves steps. Easy to care for, because of modern durable finishes. Can be set up all ready so that husband may get own breakfast quickly, without trouble.

Reliable Results Each Time—

With automatic features failures are almost impossible. No need to peek in, watch carefully or devote entire attention to cooking. Results are easily duplicated time after time. With coffee the method is always the same, and the results always the same. Better taste, because bitter oils released by boiling, are not brought out by electric percolator or syphon coffee making.

Saving in Time—

When only a light meal is required, appliances save extensive preparation and cleaning up afterward.

Saving in Cost—

Quantities cooked are just enough to suit the occasion. If only a little snack is wanted, no need to light and heat a large oven. Economical to own if well selected from reputable manufacturer. Will last a lifetime. Cost of operation is low for service performed. (Your utility probably has charts or tables showing just what it costs per toast, cup of coffee, etc., at its particular rates. Use such material for selling the economy of electricity in comparison with other commodities.)

Cozy, Intimate—

Meals for two, three or four—a bridge foursome, a guest who drops in, a child's early supper—are cosier served in a living room with electric appliances doing the cooking. A light repast for an invalid is best prepared this way, since the appetizing odors stimulate digestion and hunger.

Use Appliance Features to Prove These Points

IN general, the above applies to all electrical table appliances. Every appliance has its special features. In fact, every manufacturer has special features. The ordinary salesman is tempted to talk in terms of such gadgets. Yet put yourself in your customer's place. Wouldn't you want to know what the device *would do for you,* no matter what the gadgets were? Therefore turn your gadgets into *services* that the customer will receive.

• USE THE SPECIAL FEATURES and gadgets of your own particular line of appliances to *prove* that they can deliver the advantages or benefits which are outlined above. Back these up by the reputation and the record of the manufacturer, as further proof that it will deliver. Avoid bragging about your manufacturer. Your customer doesn't give a darn about the usual boasts. The only thing she asks is that the manufacturer, and you too, are reliable, and know your business and have a piece of merchandise that will give long service.

All appliances suggested as gifts may be arranged in a homelike setting such as this, even on the floor of a large store. This photo shows a cooperative dealer display on a power company floor (P.G. and E., San Jose) and illustrates how dealers can capitalize on such opportunities when afforded

• NAME PEOPLE WHO USE the appliance successfully. It helps to assure your customer and make her want to have one too. Few people like to pioneer an untried appliance. But if everybody's using it, they want to be in the swim too.

• AFTER BUILDING UP in your customer's mind a picture of how she can use and gain from using such an appliance, ask if you can deliver it, or will she take it with her. Repeat the process if necessary. Yet if you have done a good job of visualizing how she can enjoy the appliance she will buy, either then or as soon as she can assemble the money.

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Save these Sales Guides. One will appear in ELECTRICAL WEST *each month. Next month the Guide will give hints on selling Home Laundry equipment, ideas and methods that have brought success to many salesmen.*

Bill Jones Speaks + + +

On Unfinished Business

MANY things flashed through the Manager's mind as he rushed to the hospital. He had known Bill Jones a long time—as long ago as a couple of decades when Bill was Justice of the Peace of the Pacific Coast mining camp, Argenta. That is, it was a mining camp then. At present its population consists of about fifty souls and a dozen Indians and Chinamen who haven't read the newspapers and learned that their boom has been busted and gone for twenty years. The Chinamen live on the Indians; the Indians live on the souls, and the souls live on recollection of past glories and of effervescent prosperity. Argenta is perched high on the mountain, overlooking the prosperous agricultural and horticultural valley in which lies the growing city of Silverton.

Bill Jones had acquired his legal education and title of Judge, by association and through the process of absorption. Some years ago an attorney employed him at his regular occupation of miner in a prospect hole nearby. One day he made an error in addition. Bill was crouched down behind a rock listlessly listing the blasts he had just fired and absent-mindedly counting them off on the fingers of one hand. The hand slipped during the enumerating process and Bill became the victim of an overly imaginative subconscious mind which knew there should be five shots. Therefore, there were five shots! Like many another physical and moral slip the consequences were unpleasant, for when Bill went back and resumed the wielding of his pick, number five hole displayed unexpected irritability at having been slighted and went off, taking with it most of the inaccurate fingers of the inattentive hand and numerous other and more or less essential or ornamental appendages.

When Bill finally regained interest in mundane trifles, his subconscious mind hurriedly and timidly admitted the error, but for some obscure reason Bill never gave it another chance and forever after seemed to lack zest for mining. So the boys made him Justice of the Peace and he served with enthusiasm and vigor for many years, although the exercise of his judicial functions left Bill much time to sit and ponder while he gazed down, with disapproving eye, upon the scurry and bustle of the money-intoxicated denizens of Silverton a short eight miles away.

Bill and his wife-chum, Molly, and their battered flivver had traversed the highways and by-ways of many places. The old Model T had been parked before more than one Governor's Mansion and could claim acquaintance with a very large percentage of the auto-camps of the country. He numbered as friends, the sort of people who do things and the sort of people who do nothing. The chairmen of public service commissions in a half-dozen states and in Canada, welcomed him when he visited them. A former president didn't think it a waste of time to spend an occasional hour with Bill. Neither did the slickest gangster in the South whom Bill first met by the collision route. Among his varied acquaintances were many politicians of national importance and some thieves and embezzlers of more than local renown. He insisted that the difference between a professional politician and a robber was that the politician never had a fair chance, otherwise he would have progressed to the higher and more respectable state of burglary.

All of these and other things flashed through the Manager's mind as he rushed for the hospital; the inexplicable, intense and understanding friendship between the two which had endured for so many years, and why? Nothing whatever in common; tastes entirely different; no mutual interests; mental reactions all but antagonistic and yet—. And now Bill was hovering on the edge with pneumonia the telephone message had said.

"You can go in," said the doctor, "He wants to see you. A favorable symptom is that so far there has been no trace of delirium. Don't stay."

Many things to say had been rehearsed in the Manager's mind, but when he opened the door as the nurse rather disapprovingly went out, none of them seemed to quite fit after all. He went over to Bill who was propped on the pillows, hesitated a moment, suddenly grabbed his old friend's hand and merely said "Bill."

"Well, you old malefactor and disciple of predatory wealth," said Bill, "How is the well known power trust today?"

The Manager started to speak, stumbled and then Bill reached over and took his hand again, saying:

"Old partner—for you know I am your partner, being as how I own twenty shares of your stock—you and me are going to make some New Year resolutions, even if New Year is a week ahead. A week, in these days of social security and abundant life, is a long time. Perhaps you and I aren't going to celebrate as many New Year days as we have in the past, so we better get busy. You belong to an industry that has a lot of unfinished business on hand. Up to now you have had things pretty soft; so soft that you haven't had the mental exercise you needed to keep healthy. A peaches and cream diet doesn't build character nor does it sharpen wits. Things aren't going to go so easy from now on, maybe, but that fact in itself will prove the best thing for you that could have happened, if you will arise to the necessities, and now I know that you will. There is an old saying that you can't put a hen back into the egg from which she came. Neither can you go back to the old days, even if you want to. I am sure that you don't want to.

"First and most important you are throwing off the stultifying and traditional influence of the banker and the corporation lawyer of the 'horse and buggy' days. You are doing this to a far greater degree than you realize. You are now doing your own thinking, with the result that you are beginning to go places. In one year you have made more progress along certain constructive lines than you did in the previous twenty. A year ago the future seemed hopeless; your attitude of defeatism made a disastrous result look inevitable. A year ago your industry hadn't a single outspoken big man. Today there are at least three or four who are measuring up and who are still growing. Behind them are lot of other chaps who are crowding for places in that galaxy. That itself means an entirely different picture. You all, big and small, have increased in stature.

"A year ago you were slinking down the alleys, cowardly cringing in the threatening presence of an inflated bully. Today you are looking every man squarely in the eye. Today you are asserting your right to citizenship, not apologetically, but aggressively,

and you are earning that right. You have quit pussy-footing. You have become men; men with great responsibilities and with the courage to meet them. You have grown more open-minded, more broad-minded. A year ago you knew positively that certain things couldn't be done. Today you are doing them.

"Today with heads up you are saying 'to Hell with politicians great and tiny' and you are finding that nothing is so easy to whip as a man who lives on and by votes.

"The year 1936 will be known as the one during which a great industry found itself. It will be a great year for you, financially, morally, spiritually. Vindictiveness will have measurably defeated itself, as always happens when little men in high places attempt to dress personal animosities in the hypocritical garments of public welfare.

"There are a lot of things we must consider and start this year: Better and more logical ideas of the relationship of depreciation and obsolescence; acknowledgement and correction of unwise capital investment which sometimes has crept into our rate structure; an entirely different method of financing, and a different theory of our financial obligations to the community; acceptance of some new ideas of what the words 'public service' mean; cleaning out the closets; substitution of some of the human for the legal and the engineering; toward reduction of the percentage of bonds in our—"

The nurse entered the door and gave the Manager a dirty look. Bill glanced at her with resignation, put out his hand and said:

"Well, well, old octopus, my boss here says the seance is over. Goodbye, old scout."

"Goodbye, you old desert rat," said the Manager as he passed out into the hall. "Well?" he asked the doctor.

"Well," replied the doctor, "Bill's white corpuscle count is 12,000 or 8,000 less than normal. His pulse is as high as is his systaltic blood pressure; both are 110. Temperature is low, 100½. There is heart dilation. Bill is an old man. The crisis will come Tuesday, Thursday or Saturday."

The Manager walked down the hall and down the steps. He walked slowly. He got into his car and sat for a moment looking back toward the building—seeing nothing.

Then came the whir of the starter.

Goodwill Building + + +

["With public sentiment nothing can fail; without it nothing can succeed; consequently he who moulds public sentiment goes deeper than he who enacts statutes or pronounces decisions."—Lincoln.]

Goodwill Depends on Customer Confidence

4 Do not allow anything to break the customer's confidence in you if that can possibly be avoided. Should this happen, then do everything within reason to restore this confidence. Here is an example:

A contractor recently built a new home for a client. Through the carelessness of the mechanics employed, some cull timbers were used in the frame work of the cottage as studding. The owner vigorously complained of the quality of the material used and the builder, giving him a piece of marking crayon, asked him to strike out each objectionable piece of timber. The owner marked six or eight pieces of studding he considered unfit for use. The builder promptly condemned twice as many more with only slight defects.

The owner was more than satisfied and no further complaints were registered. Contrast this with experiences in the electrical business,—R. V. P.

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Use Service Calls For Constructive Education

5 It seems to be the common practice, although not standardized, that trouble shooters are subject to call at all hours for major cases of secondary trouble, while for minor calls such as "no lites" or "fuse trouble" such services are extended in some congested localities from 8 a.m. to 10 p.m., while in other similar adjacent territory only from 8 a.m. to 6 p.m. Consequently in the latter case it becomes necessary for the perplexed customer to call for some outside assistance and to pay exorbitant charges for such services rendered or else do without lights until the following morning at the convenience of the company, but to the expense of forfeiting customer goodwill which some have striven so hard to build up.

After all, our business is that of manufacturing and selling electricity, all other duties being incidental, yet exerting a great influence on the public relations of the company. We are well trained in some measures and are quick to jump at opportunities of extending our distribution facilities for new load for we realize that our livelihood and our existence depend on such a program. For the same reason, we should be alert to serve the public in an endeavor to hold on to our present load, to build up new load, and to carry forward our obligations.

Of the thousands of service calls that come through the offices monthly, would venture to say that most of them turn out to be trifling cases of fuse trouble which the customer is capable of correcting himself. Yet should the public insist that they know nothing about the fuse box, or do not want to tamper with the fuses for fear of endangering themselves, then it becomes our duty to extend these services without charge and certainly up to 10 p.m. for those who take the time to call in. However, the question of whether or not these service calls prove to be *instructive*, as well as that of merely restoring service will depend entirely upon the trouble shooter, or the rules as laid down by his superiors. Many customers who constantly call in for such services would be only too glad to be instructed regarding the changing of fuses and to comply with such information given them. Under such training, they would be quick to realize the lack of delay occasioned by renewing the fuses themselves, with a result that both company and customer benefit. But until the public can be trained in these fundamentals, it becomes our obligation.

Let us serve the public to the best of our ability within reason, and above all to qualify ourselves truly as public servants.—*R. C. B.*

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A Good Employer Is a Good Citizen

6 Giving employment creates goodwill. The utilities are large employers of labor. Let them broadcast this fact all possible. I would suggest running a series of advertisements in the more widely read magazines, in the daily newspapers (especially in unfriendly papers), in street cars, on billboards. Practically every bit of utility advertising, including the ads on rate reductions, should stress the "giving employment" feature.

Run these advertisements in poster form, and show, one at a time, the various classes of power company em-

ployees at their work: the operator in the factory (power plant) where electricity is manufactured; the lineman who keeps electricity flowing through to the sources of use; the meter reader; the clerk making out bills; the bill collector; the maintenance man repairing lines after a storm; the dealer selling electric appliances. All these persons and many more are employed because of the use of electricity; so this fact should be emphasized by having a suitable caption on each ad, including some such words as "Using Eectricity Keeps These Men on the Job."

On the monthly bills a similar printed slogan (or paster) could be used; each utility could mention thereon how many persons are in its employ, viz: "Using Electricity Gives Work to 000 Sunshine Power Company Employees."

When the public comes to think of electric bills in terms of giving work, its attitude toward the utilities will improve, thus gaining goodwill.—C. A. G.

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Sponsor a Live Radio Program

7 Why use Radio? It would be trite to say, "Because everyone listens in" or to give some similar reason. Radio is a crowded field, programs are extremely varied, some very good, but many more, only fair if not actually bad. The commonplace in radio programs must be avoided if it is desired to keep and hold public interest.

Goodwill is something quite different from publicity. The electric utilities already have plenty of publicity, largely unfriendly. So in building up a program, items savoring of publicity or propaganda should be avoided.

There is one type of program that enjoys nearly universal appeal. That one is NEWS. The newscasts of the present day are for the most part commonplace—the latest murder or scandal, bits of domestic or foreign political gossip, what the weather man thinks, etc.

The situation simmers down to the following statement: We of the electric utilities desire to build up goodwill. Some sort of radio program is chosen because no other medium, except the newspapers, reaches so many people of all walks of life so easily. We choose some kind of a news program because of the universal appeal. The commonplace in such a program must be avoided. The "human interest" element must be retained at all costs. The program should be of a dignified character and in keeping with the field in which we labor, so that Mr. and Mrs. Public will not easily forget whom they have to thank for an enjoyable and profitable quarter hour two or three times a week.

A program that would live up to some such title as "The March of Science" or "The Human Side of Science" would fulfill all the requirements we have set forth.

Nowdays everyone, women as well as men, are keenly interested in the latest developments of science, as they affect their daily lives.

The choice of subjects is obviously practically unlimited. Interesting, nontechnical presentations of the subject will, of course, be essential. Suggestive of the type of material that could be used, might be mentioned,—"Latest developments in motion pictures taken in natural color" — "Air-conditioning for the home"—"Present status of television for the home."

In short, the ordinary radio newscaster keeps the public informed as to what they are doing among themselves. Let the utility-sponsored scientific newscaster keep the public informed as to what science is doing for them.

The expense of such an undertaking might be more than one utility would care to assume. Therefore it would be logical for the P. C. E. A. to sponsor the program and prorate the cost among the utilities, and then to see that each received proper credit and recognition. —F. V. G.

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To the Public: The Employee Is the Company

8 Every employee should give wise and careful consideration to all problems resulting from his contacts with the public. His own relationship with his superiors within the company, important as that is to him personally, is really secondary when compared to his relations with the public. There exists a closer bond of mutual understanding and contact within the company itself than can ever exist between the company and the public. After all, the company and its employees are the servants of the public.

Any employee who fails to meet the problems presented him by the consuming public with courtesy, tact, patience and kindness; disposing of them promptly and effectively, no matter how trivial or unimportant they may appear to him, is unwise, improperly trained, indifferent to his responsibility or actually misplaced in his job.

A lady customer of an electric light company, called at the office regarding a balance that had been carried forward on her bill for several months. She had been remitting by check, mailing it each month to the local office. A cancelled check of the exact amount of the balance gave her the impression that the bill had been paid. The clerk who waited upon her ran hurriedly through the account, satisfied himself of her error, but failed to explain to her completely the coincidence of the amount of the balance and the cancelled check. The customer angrily insisted the bill had been paid. The clerk, with a rapidly growing line of customers forming at his window finally lost his temper and all but ordered her from the window.

In deep humiliation she vowed she would never enter that office again.—*R. V. P.*

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Friendliness to Customers Will Build Goodwill

9 A successful business man once made this statement, "The personality of a great business is expressed through its employees."

If the employees in any office would consider the psychological effects of their dealings with the public, customer goodwill would be bettered to a great extent. Let us consider a few situations wherein some applied business psychology could well be applied:

What attitude do we assume and what impressions do we leave with our customers after they have transacted some business with us?

Do we promptly render what service we can with the attitude that it is a pleasant duty?

Can we satisfy the queries of a critical and often mis-informed public in a satisfactory manner without assuming superiority or condescension?

Are we patient and diplomatic with the chronic kicker, can we handle him in a friendly and efficient manner so that neither will be a waster of time?

A study of the annual reports of the Pacific Coast group of utilities shows that nearly 9 tenths of our 2 million customers may be grouped in the lighter load class of domestic, residential, and commercial consumers. Virtually each month direct personal contact is made with this vast group of consumers, through the medium of service, sales and collections.

In this wide field of service and direct contact with the public, the employees have an opportunity to perform an important service for the utilities.

In order that the utilities may derive the most benefit from such employee service, I suggest that the utilities organize suitable classes of instruction for their employees in what might be termed, "Applied Business Psychology" with attendance required of those employees whose duties place them in direct contact with the customer public. —L. C. E.

Electricity Gains in Popularity On Swedish Farms

By H. EDHOLM,
Engineer, Royal Swedish Board of Waterfalls.

ELECTRIFICATION of Swedish agriculture, undertaken by the Royal Board of Waterfalls, has progressed to the enviable stage where over 4,000,000 acres, representing three-quarters of the area which is at present considered capable of electrification, are capable of being served from distribution lines. The Board, together with private generating companies, wholesales power to distributing agencies in the rural areas and supplies the farmer with up-to-the-minute information and data on rural electrification and new applications on the farm.

The electrification of Swedish agriculture began in the war and post-war periods which were characterized by high prices, high installation costs and the scarcity of material. In the beginning it was the scarcity of illuminating oils which necessitated electrification and at first, power applications awakened but little interest among the farmer. Under such circumstances the consumption necessarily was small and the heavy fixed charges constituted a high proportion of the cost of service. In the early days the price for lighting current was as high as 11 cents per kw.-hr., for small motors 6 cents per kw.-hr. and for large motors 4 cents per kw.-hr.

Modernization of rates took place in the subsequent period and entailed making overhead costs a fixed charge and independent of consumption, the fixed charge being calculated variously according to acreage, floor space or individual circumstances. This enabled current to be charged for at a price corrosponding to the variable costs plus a small addition for loss of energy in transit. Today a representative tariff carries a fixed charge of 40 cents per acre with a charge of one cent per kw-hr. during the summer and 2 cents per kw.-hr. during the remainder of the year.

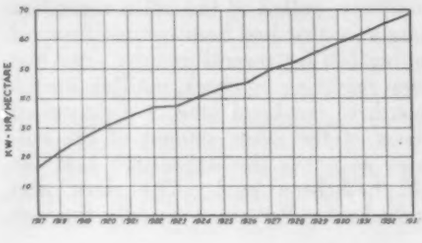
It is interesting to note that the introduction of this new price policy did not involve any remarkable changes in the total changes to individual consumers because of their low rate of consumption but it offered great promotional possibilities for the more extensive use of electric power since it meant in reality a lowering of the cost for increased consumption of from half to one-tenth of the previous price.

The first beneficial effect felt from the new rate was the considerable improvement in illumination of farm buildings and houses without marked additional cost to the consumer. It made electric motors in threshing successful competitors to gas or oil engines and rendered possible a more general use of small motors for milking, cooling, grinding, cleaning of seed, pumping of water, transportation, etc.

A further stage in the development of Swedish agricultural rates is seen in the increased adoption of special tariffs for continuous consumption, especially for water heaters, for which the flat rate produced a considerable demand for wash rooms in cowsheds and also in the farm home itself. Under these special tariffs power may be paid for either at a relatively low charge per kw.-hr. during the night time or for a fixed charge per annum calculated on the current consumption of the installation in question. Because of the varied use to which electricity may be adapted on the farm many farms which wish to make highly developed use of electricity can now advantageously procure part of their requirements for motors and lighting at a fixed annual price in accordance with the so-called minimum tariff. In this way the farms purchase a certain number of kilowatt-hours at about $50 per year per kw.-hr. For excess used over and above this amount the usual price per unit is paid. By means of this tariff, farmers who use electric power for various purposes are enabled to reduce the average price for energy from 1 cent to half a cent per kw.-hr. and, as electrification as agriculture progresses, it is to be expected that the minimum tariff should come into more general use especially on medium size or large farms.

It is to be expected that the revision of retail electric rates would be based upon concurrent changes in wholesale rates offered by the Royal Board of Waterfalls. Table I shows the relationship between the wholesale and retail price of electricity in a large area in Sweden.

Fig. 1—Power consumption in agriculture, 1917-1933, within the distribution systems served by the Royal Swedish Board of Waterfalls. Figures are in kw.-hr. per hectare



Progressive reduction in size of Swedish farm buildings has been possible by the use of electricity for drying crops

Table I—Wholesale and Retail Energy Costs Costs in Sweden

	Wholesale Purchasing Price	Retail Selling Price
Fixed distribution charge per acre	$ .20	$ .40
Charges for:		
Minimum tariff per unit (kw.) without extra charge for the units consumed under the minimum tarif per year	44.00	50.00
Excess consumption, i. e. units over and above the minimum tariff, May-August inclusive, per kw.-hr.	.09	.01¼
Other months	.018	.02½

Progressively lowered rates have been responsible for an increased use of electricity as shown in Fig. 1, according to which the sale of current has increased approximately 70 per cent during the past ten years. Having provided facilities for serving a large portion of the agricultural area of the country, more efforts are now directed toward increasing the use of energy on already electrified farms. During recent years a series of investigations has been

undertaken which has resulted in some very helpful new applications for the farmer. These are described briefly in the following paragraphs.

A new method has been worked out for drying and ventilating grain harvests in silos which has eliminated the necessity of special farm buildings. The method implies a repeated drying of the surface of the kernel of the grain, the drying process being repeated at relatively long intervals during which sufficient time for the humidity remaining in the interior of the kernel to reach the surface. Drying costs by this method are approximately 1¼ cents per cwt. of grain. The compact storage of grain in a silo renders possible a reduction of the volume of the store house by 50 to 60 per cent and offers the additional advantage that the threshing of the corn can be effected immediately after driving in from the fields even if the kernel is moist. In this way special barns are dispensed with.

The success of this investigation led to the study of farm buildings with the result that building costs can be considerably reduced by the use of electricity and the saving in building capital is found to be more than sufficient to pay for the purchase of modern drying equipment. Heretofore the main tendency has been to extend the use of the electric motor as a substitute for other sources of power in buildings of the traditional type. A new phase has hereby set in in the electrification of agriculture whereby the supply of electric power has made it possible to reduce the total cubic capacity of agricultural buildings.

Electricity also has been found to enable the individual farmer to dry his grass crops with a relatively simple mechanical equipment. According to this recent development the drying is done in an apparatus which can be constructed by the farm workers from local material and adapted to the size of the farm. The same fan which is used for grain drying is used to blow heated air over a series of small hurdles upon which the drying is effected in one or two days. The drying racks are fed and emptied during the day time and the drying taking place continuously through the night. Cost of drying amounts under normal conditions is about ¼ cent per pound of hay and the drying permits the grass harvest to be treated immediately without the loss of any of its inherent nutritive properties.

Again using the fan which is used for grain and hay drying, a new system of ventilation of animal barns is possible by utilizing a small two-speed motor. The velocity and quantity of air is regulated by a thermostat so that in

Electric demonstration farm building at Malfvik, Stockholm. Note the clean appearance, the lighting units on the exterior of the building and the electric hoist into the storage space

winter the temperature can be maintained practically constant from 54 to 57 deg. Using the minimum tariff described above the annual working cost is not more than 20 to 25 cents per animal per year for this service. Thus, on the flat rate schedule, the fan can be used effectively about 300 days per year which greatly enhances its earning capacity and reduces to a very low figure the cost of power.

Another novelty in rural electrification is the automatic cleansing of cattle sheds by means of endless chains equipped with rakes which transport manure directly from the gutter to the manure heap. A small geared motor of from 1 to 3 hp. is sufficient for this work and operates for less than a cent a day.

The development of the electrification of Swedish agriculture is by no means completed and the best propaganda for such development has been found to be in the minimum flat rate which renders possible an increased consumption of power at relatively low costs. Pamphlets and other data distributed free to the farmers and dealing with rural electrification have been found to be well received and responsible for a greater interest in farm electrification. A number of suitably situated farms, which in any case would require construction or rebuilding are furnished with assistance, drawings, suitable electric plants and other equipment by the Royal Board of Waterfalls on the condition that they shall be available to visitors and especially local farmers who are thereby afforded an opportunity to study first hand the advantages of electric power. The most recent of these demonstration farms is shown in a film which is available free of charge to agricultural associations. By continued development, electric power might gradually become the means by which agriculture, industrially rationalized, will be raised from its present and, in some respects primitive position, to a more pleasant and profitable occupation.

Willamette Water Shed Studied by Army Engineers

Investigation of the Willamette River basin (Ore.) for the purpose of developing a coordinated plan for control and utilization of its waters in the interest of power, navigation, irrigation flood control and other purposes, including municipal water supply and sewage disposal, is now in progress under the direction of U. S. army engineers. An allotment of $200,000 from WPA funds is being used for the greater part of the field work. Additional engineering and technical services not obtainable with WPA funds are being secured with an allotment of $25,000 from regular river and harbor funds.

The Willamette River watershed has an area of 11,200 sq.mi. and a mean annual runoff of about 34 in. However, precipitation in the valley floor is very light during May to August inclusive (about 3 in.) which is not enough for the best crop returns. Farming is successfully carried on in the valley on 2,700,000 acres of land, about 500,000 acres of which is capable of greatly increased production if irrigated. Moderately large floods inundate about 300,000 acres including considerable urban property. These and extreme floods may be controlled by reservoirs and low levees. Navigation of the river, limited by shallow water during the dry months, can be improved greatly by stream regulation. With the development of feasible storage sites about 400,000 kw. of hydro-electric power can be developed in tributaries from the mountainous east side.

The investigation is in charge of Col. T. M. Robins, division engineer, North Pacific Division. C. I. Grimm is chief civilian engineer and R. D. Goodrich is consultant on flood control. Field work consisting of surveying, mapping and exploration of foundations for dam sites is in charge of Lt. Col. Milo P. Fox, district engineer. First Portland District; H. A. Rands and G. E. Goodwin, principal civilian assistants.

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• STEWART DIXON, supervisor of the Chilliwack Cow-Testing Assn., has been appointed to the staff of the agricultural division of the B. C. Electric Railway Co. He will take up his new duties on December 1, and will have his headquarters at Vancouver, B.C. Mr. Dixon has been appointed to a newly created post in the agricultural division of the power company, which is now being further enlarged. It is stated that George Challenger, prominent in agricultural research work at Kamloops, B.C., is also being added to the department.

In the Realm of Science + + +

[Devoted to the research and scientific developments which affect the electrical industry and which are being carried on in the engineering departments of Western universities. Edited this month by Prof. W. A. Hillebrand of the Electrical Engineering Dept., University of California]

Nerve Currents Amplified for Analysis and Study

Research in the Field of Action Currents In the Nerves of the Auditory System of Animals Provides Valuable Original Data On the Mechanism of the Ear. Study of Minute Nerve Currents Made Possible by Delicate Amplifier

By LEONARD J. BLACK, Ph.D.
Dept. of Electrical Engineering
University of California

MOST of us who are favored with the enjoyment of the many sounds that surround us feel little curiosity concerning the marvelous mechanism by which we hear. Our ears, acting as machines to transform air waves into a form suitable to stimulate the auditory nerve, surpass in complexity and delicacy any man-made machine. This remarkable organ of the human body enables us to hear tones ranging from 20 to 20,000 cycles per second and sound intensities from 0.0000000004 millionths of a watt up to 20,000 millionths of a watt.

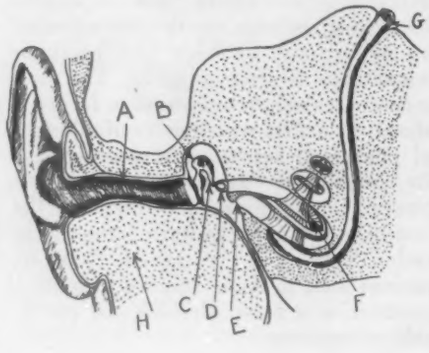
In order to understand the mechanism of the ear, an understanding of the principal structures is essential. Fig. 1 shows a simplified schematic diagram of the parts of the ear. Anatomically the ear is divided into three parts: the outer ear, the middle ear, and the inner ear.

The outer ear consists of the external ear and the ear canal. The ear canal is about 1¼-in. in length. Its inner end is closed by the ear drum.

The middle ear is a bony chamber containing three small bones which transmit sound vibrations gathered by the outer ear to the inner ear, to be analyzed. Because of their appearance the three bones are called the hammer, the anvil, and the stirrup. The lower end of the hammer is attached to the ear drum. The top of the hammer is connected by a joint to the anvil, which is connected in turn to the stirrup. The foot plate of the stirrup is joined to the oval window of the inner ear by an annular ligament (Fig. 2). The middle ear is connected to the outside air by means of a small tube which terminates just back of the nasal passage. This tube allows the air pressure in the middle ear to adjust itself to the varying atmospheric pressure. Infection sometimes reaches the middle ear through this tube.

The inner ear contains the important receiving station, the cochlea, where the mechanical vibrations are transformed into nervous impulses. The cochlea is housed in a bony spiral resembling a snail shell with two and three quarters turns. Cross-sections of the cochlea as it twists into a long spiral are indicated in Fig. 1. If uncoiled, this member would appear as a straight tube about 1¼ in. long and with an average width of about one-sixteenth inches. The whole of the inner ear is filled with fluid. The cochlea has only two small openings into the middle ear, the oval window and the round window. The foot plate of the stirrup fits into the oval window. The round window is closed by a thin elastic membrane.

Fig. 1 — Diagrammatic section through the right ear. A, ear canal; B, hammer; C, anvil; D, stirrup; E, round window; F, basilar membrane; G, auditory nerve



The basilar membrane divides the cochlea into an upper and a lower gallery (Fig. 3.) The oval window is located in the upper gallery and the round window terminates the lower gallery. The basilar membrane supports a complicated structure on its upper surface. This structure contains the auditory sensory cells and the terminations of the auditory nerve. It is by means of these sensory cells that the mechanical vibrations are transformed into nerve impulses. Each auditory nerve consists of approximately 26,000 individual nerve fibers.

Sound waves reaching the ear set the ear drum into vibration. This movement is transferred by means of the three small bones of the middle ear to the oval window. The ear drum and the three bones act as a sort of transformer so that air vibrations will be conveyed to the inner ear with very little loss of energy. The foot plate vibrating in the oval window causes movement of the liquid and vibration of the basilar membrane. The vibrating membrane stimulates the auditory sensory cells. The oval window serves as a relief valve for the liquid of the inner ear. Mechanically stimulated sensory cells presumably generate small electrical voltages which stimulate the endings of the auditory nerve. Thus, nerve impulses carrying the sensation of hearing to the brain are initiated by small electrical voltages generated in the inner ear. We are unable to explain in precise terms how these voltages are generated in the inner ear, nor the exact form of the nervous impulses carried to the brain. Concerning these phases of hearing, there is considerable scientific speculation.

By the use of animals much information concerning hearing and the factors affecting the acuteness of hearing can be obtained. It is, of course, necessary in such studies to have a measure of the animal's hearing. Conditioned animals have been used for some time in hearing studies. The animal to be conditioned is placed in a suitable stock with a forepaw on a metal plate. The stimulating tone is sounded, directly followed by a voltage applied to the plate

sufficient to cause the animal to withdraw its paw. The animal soon learns to withdraw its paw when the tone begins. When the animal is thus conditioned experimental studies can begin, the withdrawal of the paw being an indication of the animal's hearing.

Only a few years ago scientists began a new method of testing hearing in animals. Whenever a nerve transmits a nervous impulse there is always associated with it an electrical disturbance called an action current. Action current studies are of great importance, as they are easily recorded and are a satisfactory measure of the nervous impulse. Pioneering in the study of these action currents in the auditory mechanism was done as early as 1910. However, to Wever and Bray, two Princeton psychologists, belongs the credit of inspiring the many recent workers in this field. In 1930, they announced that

Fig. 2—The three bones of the middle ear; A, hammer; B, anvil; C, stirrup

by placing electrodes on the exposed auditory nerve of an anesthetised animal, then leading off the nerve action currents through an amplifier, the tones produced in a loud speaker connected to the amplifier were similar to the tones communicated to the animal's ear.

For the past year and a half, measurements in this laboratory have been concerned with a quantitative study of the voltages generated in the auditory mechanism of anesthetised animals. The voltages generated in the inner ear are of two types: First, the voltage generated in the cochlea by the sensory cells, when they are stimulated by the vibrating basilar membrane, and secondly, true action currents of the auditory nerve. The latter are the impulses that follow the auditory nerve to the sensitivity of the animal's ear to varing.

The voltage generated by the stimulated sensory cells was measured with a fine wire connected to the round window of the inner ear. This serves as a

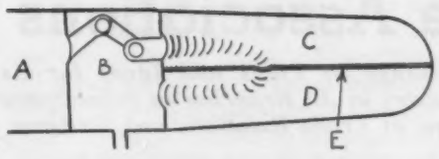


Fig. 3—Simplified diagram of the ear; A, outer ear; B, middle ear; C, upper gallery of cochlea; D, lower gallery of cochlea; E, basilar membrane

path of low electrical resistance to the inner ear. The action currents were measured with a fine wire in contact with the auditory nerve.

The magnitude of these voltages ranged from less than one millionth to one thousandth of a volt. For this reason, it was necessary, to amplify, by means of a specially designed amplifier, these small voltages many thousands of times before it was possible to measure or record them.

These studies of Dr. Black and his associates, most significant and valuable in increasing the knowledge of hearing and the mechanism of the ear, give the layman a glimpse of the wonderful field opened up for research and study in the endeavor to acquire a more perfect knowledge of the marvelously intricate nervous systems of humans and animals. Since nervous impulses are definitely associated with electrical disturbances, the precision and delicacy of electronic devices provide a new tool for medical science in its efforts to alleviate human ills.

—The Editor.

The waveform of the sound stimulus was reproduced in the voltage generated in the inner ear (by the sensory cells) for stimulating tones throughout the audible range of frequencies. Speech as reproduced by this response was clearly intelligible. In this respect the ear functions in a manner similar to a microphone. Although the intelligibility was high, the reproduction of the speaker's voice lacked naturalness. This was due to the difference in the sensitivity of the animal's ear to various frequencies, the ear being most sensitive to frequencies in the neighborhood of 1000 cycles per second. An electrical response was obtained for sound intensities very close to the minimum intensities that can be heard by a human.

By connecting the electrode to the auditory nerve of the animal and "listening in" a message spoken into the animal's ear could be detected. However, in this case words were not easily recognized. Measurements showed that the waveform of the stimulus was badly distorted in the response from the nerve. Also frequencies above 3000 cycles per second were not found in the auditory nerve.

These measurements support the "place theory" of hearing. According to the place theory the basilar membrane is resonant, at various points along its length, to various tones. Therefore, the vibrations due to different tones are transmitted through the basilar membrane at different points. Thus, different tones excite different groups of fibers. The sensation of different pitch would consequently be a sensation in different nerve fibers. Loudness of a tone is probably proportional to the number of fibers stimulated. These studies are also telling the effect of various drugs on hearing.

Cocain applied to the inner ear causes cessation of the electrical response. If the animal is painlessly killed, the response rapidly disappears.

The results clearly show that the inner ear converts mechanical vibrations into electrical voltages. These voltages presumably initiate the nervous impulses that carry the message to the brain. This research was done under the auspices of the University of California by Walter P. Covell, M. D., of the George William Hooper Foundation for Medical Research, and Leonard J. Black, Ph. D., of the Department of Electrical Engineering.

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...Contemporary Reading

RELAY SYSTEMS, by I. T. Monseth, general engineer, Westinghouse Electric & Manufacturing Co., and P. H. Robinson, engineer, Houston Lighting & Power Co.; first edition; published by the McGraw-Hill Book Co., Inc. Fabricoid bound; 6x9 in.; 549 pages; illustrated. Price $6. For sale by the McGraw-Hill Retail Room, 883 Mission St., San Francisco.

One of the most complete texts on relaying yet published. Foundations for later discussions of relay systems are laid by a thorough quantitative analysis of the magnitude and relations of currents and voltages in the system in the first six chapters which are devoted to a complete analysis of fault calculations including excellent chapters on symmetrical components and the calculation of fault currents and voltages. Relay systems and relay application data are given in subsequent chapters and include recent developments in high-speed relaying of distance, balance, differential, pilot-wire and carrier-current types as well as a discussion of instrument transformer characteristics, vector analysis, wave form and relay testing.

With the Trade Associations + + +

[An Exchange of Plans and Ideas for Assisting the Industry in All Branches to Solve Some of Its Problems of Trade Relations and Business Ethics]

Motor Group Rotates Officers in New Plan

ROTATION of the officers among the members of the Motor Dealers Assn. of Northern California was decided upon at the last meeting in 1935 of that organization. Louis J. Douat, Buzzell Electric Works, San Francisco, was elected president of the organization, succeeding Frank Boyd, Pacific Electric Motor Co., of Oakland, Calif. As it develops, the plan is to move up the officers one step each year and to add a new member from the membership at large to the board of directors as each director in turn becomes president. T. L. Rosenberg, Oakland, was elected vice-president and F. O. Sievers, of Kuchel & Sievers, San Francisco, was named treasurer. Kenneth Ryals, of Stone Ryals Electric Co., San Francisco, was elected secretary. In addition to the officers the directors include E. J. Douglas, of Enterprise Electric Works, San Francisco, and Dan Bronson, of California Electric Co., Ltd., Oakland.

At the annual meeting Seth Butler, who had just recently been named secretary-treasurer when that post was made vacant by the resignation of Kieth Noble, announced that he was selling his interests in the Weidenthal-Gosliner Electric Works, San Francisco, and returning to the lumber business in which he had previously been engaged.

In setting up the committee structure for the organization, President Douat announced the purposes of each of the committees as follows:

The membership committee is to investigate the qualifications, both from a business and ethical standpoint, of any prospective members, so as to keep the personnel of the association limited to those individuals and firms with sound business practices and an ethical record.

The reconditioned motors and rentals committee has as its purpose that of

LOUIS DOUAT

continually analyzing and studying market conditions with a view to interchanging data and information to the members and in this fashion assist in stabilizing the market on a basis of actual facts.

The winding and repairs committee will have as its purpose the continuous study of methods and shop costs with a view to improving the technique and assisting the members by such interchange of data to derive margins based upon actual facts.

The electrical industry relations committee will deal with the problems of mutual interest between the members and the utilities, manufacturers, wholesalers, inspectors and other groups in the electrical industry.

The business promotion and publicity committee will have as its purpose the preparation and undertaking of activities to create new business for members and to enlarge the scope and volume of the business of motor dealers.

The fair trade practice committee will act as a forum for the establishment of fair trade practices and will be the body to adjudicate any differences arising therefrom.

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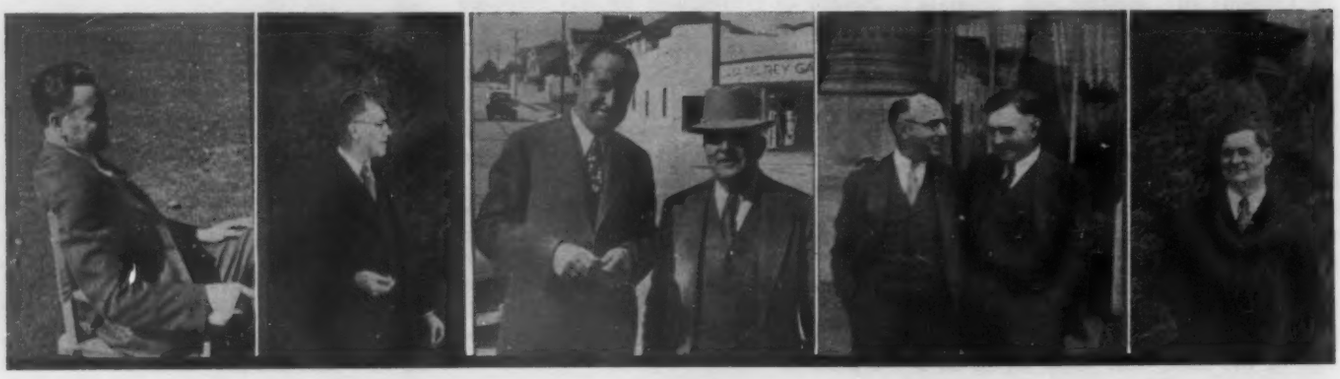
Motor Group Certifies Reconditioned Equipment

CERTIFICATION of reconditioned motors, in order to establish definite standards for such equipment, has been set up by the Electric Motor Specialists' Assn. of Southern California under a plan which has now been operating for several months.

Originally started as a rather complete program, including the checking of business and mechanical facilities of each firm participating, the program has now been reduced to a simple guarantee of the used equipment along the lines approved by the association. A certificate is issued to each member who agrees to the conditions set forth for the use of a special decalcamania label which is affixed to the reconditioned equipment. The main certificate entitles the member to affix to electrical equipment altered, repaired or reconditioned the standard label of the association, provided that for each label thus af-

***CONTRACTORS OF NORTHERN CALIFORNIA** plan another chapter meeting in Fresno in February. Here, however, are a few candid snaps taken at the last meeting in Santa Cruz. Left to right: George Eldridge, secretary Oakland association; Fresno's Lewis, who was growing a "pioneer day" beard; "Kelly" Courtright of Fresno discovered an old timer, Bob Cardiff, at Santa Cruz; Ed Martin, chapter secretary, and Harry Eklund, of San Rafael; and host Irvin Smith, of Santa Cruz*



fixed the member offers upon delivery to the customer a written guarantee for the equipment. Each dealer is given a certificate number, which is also printed on the decalcamania, together with the name of the firm.

This new practice has been one long recommended by several leaders in the motor industry in southern California. Frank Broiles for many years advocated such a label or seal. Spasmodically development of such a propostion has been worked upon for some time. Finally, under the direction of Hobert W. Barnes, of Biddle Trade Bureau, who is secretary of the association, the details were developed and the plan put into practice.

Originally it was intended to appoint a disinterested, competent person to make an inspection of each members' shop who applied for the certificate and to check the shop's facilities and technical qualifications. The commercial reputation, the willingness to maintain a high standard of workmanship, and stand back of the guarantee, plus the available equipment for producing high quality work and performing the required tests based on the recognized standard requirements of the A. I. E. E. and of the N. E. M. A. were to be taken into consideration.

As operated now, the member firm has a certificate, revokable by the association upon failure to guarantee his products. The decalcamania transfer is provided in quantities at a reasonable price. These transfers are attractively colored in gold and red and easily applied to a reconditioned piece of equipment. A further feature is a guarantee tag which is affixed to the equipment. On one side advice is printed as to keeping equipment properly fused and lubricated and using it only with proper current supply, type, voltage and frequency. On the other side of the tag is the guarantee against defects in accordance with the terms and conditions of guarantee of the original manufacturer. A written guarantee is also provided by each member on his own individual stationery but in a form approved by the association.

Advantages of this plan to the consumer are those of guaranteed quality, workmanship, and material. To the motor dealers it establishes a prestige and an advertising value which has assisted in the stabilizing of the reconditioned motor market in the southern California region. It makes a fine selling feature and establishes a public confidence in the firms participating.

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Long Beach Man is Named Inspection Chairman

OTIS NEWCOMB, city electrician of Long Beach, was elected chairman of the Southern California Chapter, Southwestern Section, International Association of Electrical Inspectors at its first fall meeting late in November. He succeeds J. H. Crannell, electrical inspector, City of Glendale, who has been chairman during the past year. H. G. Ufer, Underwriters' Laboratories, will continue as secretary.

Mr. Ufer suggested the cooperation of the Chapter in support of an exhibit which would show the right and wrong wiring practices. The plan is to make the exhibit portable for use by the city electrician members of the Chapter in their various cities at local events in which such publicity could be used.

H. A. Hockensmith, managing director of the newly formed Electrical Development League of Southern California, was introduced and described that organization's purposes and program for the development of the electrical business in southern California. Later Arthur Veit, county electrical inspector, was appointed to represent the Chapter at the Electrical Development League meetings.

Some of the interesting inspector problems discussed had to do with the variance between the different methods of grounding at services as required by the County of Los Angeles, the City of Los Angeles, and under the Industrial Accident Commission's safety orders. Likewise gas engine installation methods near oil wells brought forth considerable discussion as to the hazards existing from exposed distributors as well as hot exhaust gases. Other discussion was had on electrolysis or corrosion on water and gas lines in certain areas. J. F. Hodges of the Southern California Edison Co. pointed out that soil conditions are being treated to neutralize acid conditions which are often the real cause of trouble.

Wiring in buildings where manufacture or treatment of liquors is done also caused discussion. Frank Short, electrical engineer, Industrial Accident Commission, read from a publication of the National Board of Fire Underwriters on the subject. The point was also made that in orange and lemon packing plants wherever Etheleyne gas is used only vapor proof fixtures and fittings are to be used in the vicinity of the gas.

Upon invitation from O'Neill Barnwell, the next meeting will be held in Beverly Hills, Jan. 20, at which time Mr. Barnwell will present a number of interesting inspectors' problems, assisted by G. E. Price and Frank McMahon of his department. J. G. Moyen, Square D. Co. and J. F. Hodges, Southern California Edison Co., will discuss a new line of service equipment, with samples and exhibits.

A little informal "conference" between George Draeger, San Francisco; Frank Thomas, Fresno, and Lloyd Flatland, then president of the chapter; The Sacramento representatives, Del O'Connor, and George Foss, mayor if you please; new president of the chapter, Charles Langlais, with new vice president, Louis Douat, back from the boardwalk; bearded Fresnans Lewis and Elzea, and ex-parte discussion out on the lawn—Lloyd Flatland, George Foss, Ed Martin, "Kelly" Courtright, George Eldridge,and seated is Mano Zann

EDITORIAL + + +

Opportunities Lie Ahead

ANOTHER page has been torn from the immortal calendar of Time, exposing a new year—1936. To its stockholders, the people like you and us who earn our livelihoods in one of the multiple branches making up this business of generating and utilizing electricity, the industry shows a favorable balance sheet for the year just closed and a bright prospectus for the twelve months ahead. Nineteen thirty-five was a year of shuffling, shaking, shaping. Purpose replaced perplexity. Confidence and assurance banished frustration and discomfiture. There were profits where before there had been losses. Courage and faith displaced despair and apathy. So it was that 1935 was a year of progress, with the definite promise of still greater things ahead. Thus when we inventory the accomplishments of the months just passed, we see more clearly the prospects for the months to come:

1. Public acceptance of the comforts and conveniences of electricity in the home made greater strides than ever before in the history of the industry. Result—record sales of home appliances, particularly of refrigerators, laundry equipment, electric ranges, radio. As a snowball grows in size and momentum as it rolls, so too, this acceptance promises to carry over into 1936. Predictions are for another record year in refrigerators, ranges, water heaters, air conditioning. This means profits to manufacturers, distributors and retailers; load for the utilities.

2. Here in the West there is definite prospect of a resumption of building activity. Building permits for 1935 were 88 percent ahead of the preceding year. In many sections there is a definite shortage of homes, apartments, stores. The contractors and suppliers, whose business has shriveled and suffered far longer than that of other branches of the industry, appreciate the real significance of this. The industry as a whole can benefit also if the electric kitchen and wiring adequacy are stressed as this building program unfolds.

3. Power company load, as expressed by kilowatt-hour output, has continued to grow, substantiating the contention that the losses suffered during the depression will be regained quickly. To a degree this has banished the fears that surplus power from government projects here in the West would upset the stability of the power market. In some sections more generating capacity is required; in almost all distribution facilities are straining under the increased loads. Here lie opportunities for the engineers whose drafting boards have been bare and whose work has been a mere routine. Here are some of the reasons for the expectations of manufacturers that business this year will be 30 per cent better than in 1935.

4. The temper of the public toward the industry has definitely turned. Bureaucrats and political oppressors no longer wield the club of unfavorable public opinion over the utilities. The public is showing more interest in good service at reasonable rates than it is in political bally-hoo. Along with this changed public attitude, has been a corresponding shift in the temper of the industry. Courage has returned; leadership is outspoken in its demands for fair and just treatment. These are good signs; signs that the worst is past.

There are other items on the balance sheet and in the industry's prospectus to support the contention that 1936 will be fruitful in opportunities. Hence we can say with assurance to every man and woman in the industry "A Happy and Prosperous New Year," with the conviction that 1936 should be all of that.

Radio and Goodwill

BECAUSE of the monopolistic character of the business, it is perhaps inevitable that many public utilities look askance at advertising. Will it sell utility service? Is a balanced advertising job desirable, using the media best suited for a given task, or should the advertising dollars be spent largely in newspapers? What about radio? These questions are raised every time a group of utility men meet.

Then there is goodwill. Can popular favor be developed by advertising? If so, what media produce the best results? Advertising in the role of agent of goodwill is difficult to evaluate at best. Yet it has real possibilities. When Charles R. Gay, president of the New York Stock Exchange, spoke recently before the Financial Advertisers' Association on this subject, he might have been addressing the public utilities when he said: "Business has become increasingly aware of the fact that it operates, as it were, under a popular franchise, and that if it is to survive, it must conduct its affairs in such a way that the franchise will be continued. It has come to appreciate that no law and no contract can protect a business or an institution whose social merit an intelligent and critical public begins seriously to question."

No business depends more upon the value of such a "popular franchise" than do the utilities. Events of the last few years have attested its importance, as waves of politically-engendered disfavor have swept over them. To create, nurture and sustain goodwill has become a major problem.

New methods for winning this popular favor are being developed and one which holds great promise is radio. Many utilities, impressed by the success of major industrial enterprises with radio advertising, are turning to radio as a tool which, through dramatization and emotional appeal can be used effectively for goodwill building. One utility has just started a series of programs to popularize the service offered by forty-one new home service workers. Another is building a dramatic program around the history of the community it serves, at the same time building itself and its service into the very life and heart of the community.

There is an old saw to the effect that people are disliked because they are not known. Properly directed advertising will overcome this obstacle. And radio advertising will bring any utility's personality into the homes of all its customers.

It seems that a lot of people like fireside chats.

Cooperation—Nevada Brand

MARRIAGES are made in heaven, we are told; divorces in Reno. Strange then perhaps is news that from the capitol of separations emanates a brand of cooperation between dealers and the utility that bespeaks family harmony in every sense of the word. In fact there is a character to the Reno brand of cooperation that is distinctly personal and homey. Yet, after all, is not the very act of cooperation a personal one, if it is to be successful?

That the cooperative program of the Sierra Pacific Power Co. and Nevada electrical contractor-dealers is successful was attested by both parties to the marriage at a recent dinner celebrating sales achievements that might seem impossible to attain in the face of conditions. These results, and the simplicity of the brand of cooperation which has brought these attainments, are told in another part of this number. Bare facts, however, hardly tell the story. There is an ingredient in the mixture which makes it work, a reagent without which the plan itself in other circumstances might fail.

That ingredient is distinctly personal. Perhaps there is a touch of the old pioneer day "give and take" in it. Perhaps the fundamentals one hears discussed so much these days—individualism, with a respect for the rights of the other fellow,— are dominant in this last outpost of our old West, Nevada, that has never been tamed or broken. For there is nothing servile or paternal about the relationship between the utility and the dealers. Each is very much an individualistic personality.

Something significant, deeply so, comes from this example of hardy self respect and respect for fellow competitors. It is that cooperation is democratic in nature. It is the give and take of free men and equals. It is not surprising that the West, which has been the last outpost of pioneering—hence of self reliance—should be the region from which more successful cooperative activity has been developed than elsewhere. The Reno cooperative success brings this into focus.

Another thing is proved by this record of selling achievement. Elaborate schemes are not necessary to cooperation. A simple outline of mutual rights, mutual responsibilities, is sufficient guide for self respecting men. It will not escape the penetrating observation that the fundamental right recognized by all parties is that each is entitled to a fair profit.

Who Will Promote Wiring?

HOW is the industry going to make it easy for consumers to use its equipment and services? Much has been said about the convenience of electrical appliances but the benefits derived from their use too frequently are nullified by the inconvenience of inadequate wiring in the home. By far the greatest majority of consumers reside in homes and apartments built when one lighting outlet per room was considered ultra modern. Is that why so many useful appliances are relegated to the top shelf of the cupboard after they are purchased? Are long, frazzled cords and dime store double-sockets truly representative of the industry's conception of consumer convenience?

The answer to this question lies not in the mechanical problems incident to wiring modernization of older dwellings but in the sales and promotional field. Manufacturers, recognizing the need for low cost supplementary circuits, have devised several unobtrusive and satisfactory methods of adding electrical outlets without so much as removing a base board. Contractors are only too happy to make such installations. However, the margin of profit on such jobs is too small to warrant even the most modest promotional program by the contractors. Besides is it fair to expect the contractors to carry the entire load of promoting wiring modernization and adequacy when the whole industry will benefit from greater customer acceptance of things electrical, larger sales volumes and greater revenues if convenience outlets really are convenient?

Modernizing the wiring of millions of homes is too large a job for any one branch of the industry to undertake alone; yet it is an essential part of the program of increased domestic electrification. The entire industry must contribute in more tangible ways than merely lending moral support to the contractors if it expects to exploit the profitable market for goods and services represented by today's inadequately wired homes. How to do this economically and effectively is a problem that might be solved by cooperative effort; certainly it is a problem that the industry can no longer ignore.

Significant Trends + + +

[*Signposts which point the road to improved business or method, brief, pertinent, useful hints as to HOW someone has blazed a new trail*]

...in Construction

In any living room furniture and lamps may be moved and still find a handy source of electricity anywhere along the nearest wall. A piece of the strip set in the top of the mantel serves clocks, light ornaments, or picture lighting troughs

Breaking the Bottle Neck of Wiring Inadequacy

WIRING, like the weather, has been the topic of much conversation. Some of it has been acrimonious, too. Yet, as Mark Twain remarked about the weather, nothing has been done about it. Of late, however, the conversation has grown scarcer and the doing of something about it more pronounced.

Possibly this is because the question of the inadequacy of wiring in a modern, electrical era, has long since passed the stage of philosophy. It is an ugly fact. With every new appliance sold—and the records are all being broken in appliance sales—that fact injects itself immediately. The purchaser of the appliance, sold on its convenience and helpfulness, soon realizes, on delivery, and at the first opportunity to use it, that the device may be convenient, but electricity certainly isn't.

A result of the pressure applied to the situation by hard reality has been found in a considerable number of improvements and developments, all designed to do something about wiring inadequacy.

Wiring has always lacked "sex appeal," to borrow a term from popular parlance. Like plumbing, or digestion, it has been one of those necessities of existence the least talked about, the politer. To do anything about it required a strong job of selling an unintelligible something that was buried in walls and showed little for the amount of labor required, and hence cost. There have been complications of labor, rules, fears, and inertia. Meanwhile the public has learned to buy lamp cord and run it over and under any obstruction to achieve some semblance of convenient electrical usage. So much for background.

For those who may wish to compete in the Pacific Coast Electrical Association problem paper contest, the following article on new developments in wiring practices and methods will prove stimulating. It may even provide clues to methods that might be suggested as means to provide greater adequacy in wiring. This article will not seek to outline methods for promoting the sale of more wiring, but it should offer lines of thought which if followed may lead to the advocacy of such a program—the real purpose of the P.C.E.A. competition.

Larger Services

Insistent need for lowered range installation costs provided the first step toward breaking the bottle neck, since indeed the neck of the bottle lies in the service equipment bringing electricity into the house from the pole outdoors. To meet this primary need, armoured service entrance cable was developed. Controversy rages over whether the use of this material reduces costs from any of a number of standpoints, yet figures of wiring costs where a large volume of ranges are installed, and where the contractor stocks up, tools up, and trains his workmen to install the material, do indicate savings. Whether the economy is temporary, or whether an adequate service pipe in which later larger wires, or three wires might be drawn to replace original minimum wire sizes, is a question Electrical West makes no attempt to solve.

The point is that services, the primary bottle neck, are being increased under the pressure of range sales. With the range also comes a lower rate and greater encouragement to use more electricity. With a three wire main feed, the potentialities for increasing the use of electricity are greatly improved, especially in view of several other new developments.

Circuit Breaker Switch

First and perhaps most significant, is the small circuit-breaker switch. This device makes possible the decentralization of circuit protection. Which is to say that it is no longer necessary to concentrate the fuse protection against overload and possible fire, as has been done for decades, at the meter location. The meter location, convenient to the meter reader perhaps, is possibly the most inconvenient location about a house for replacing a fuse that has blown under the heat of overload. First sub-fuse panels were located indoors in some closet or hallway. Now, thanks to the small circuit breaker switch, or "flip-on," even this concentration is unnecessary.

Westinghouse brought forth the first such circuit breaker switch, locked and sealed at its proper ampere rating, and non tamperable. Soon other companies developed similar devices. Now General Electric announces one of such

small dimensions as to enable its installation in an ordinary outlet box, the same as a switch. In fact it can be used as a switch for controlling the lights or convenience outlets, affording overload and short circuit protection at the same time. It cannot be locked-in while the circuit is overloaded. Pennies cannot replace it, nor other makeshifts endanger the circuit.

Of particular interest to architects and electrical contractors specializing in residential and apartment buildings is the use which can be made of this new development under the provisions of Section 806-D3 of the National Electric Code. In accordance with this section, a tap or sub-feeder from the main may be run without locating a switch or fuse at the point where the tap leaves the main, provided the tap is not over 25 ft. long and has at least one-third of the carrying capacity of the main. The tap must terminate in a single fuse or a circuit breaker of the proper capacity to protect the final circuits.

Under these provisions, the new branch circuit breaker may be so located as to add greatly to the convenience of the wiring system. For example, from a suitably protected No. 4 AWG main incoming circuit, a number of No. 10 branch circuits may be run to remote points, terminating in 20-ampere breakers. From the 20-ampere breakers' terminals, short runs of No. 12 conductor may be made. Such a wiring system will, in many cases, be more economical and prove more efficient in overcoming voltage drops than the conventional method of grouping 15-ampere fuses or breakers at the No. 4 service and then running to remote points over No. 14 conductors.

Called a "radial" wiring system by General Electric Co., this system in reality is a return to what used to be known as a "tree system" many years ago when each outlet carried its own fuse link protection in the wooden roset at the ceiling.

Small thermal circuit breaker switch which can be mounted in an outlet box and used for the joint purpose of switching and overload protection

With such a system it is conceivable that those portions of a home requiring more than the ordinary in circuits, such as the breakfast room, or kitchen, could have two circuits, each protected by such a thermal switch, from the same bus or feeder, without overloading. At that time when might come the concentration of load on those circuits, such as at breakfast time, when appliances and an auxiliary air heater might be operated simultaneously, other taps from the same bus would be inactive. A better diversity and more useful application of all existing circuits would result, and the problem of locating a few more outlets because of change of furniture location or the need for a decorative lamp somewhere, would only mean a short tap to the bus.

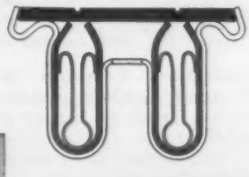
Plug-in Strip

Appropriately enough another manufacturer has come forth with a most convenient wiring method. "Plug-in strip," invention of a Chicago architect who anticipated what several westerners had talked about but never developed, has been placed on the market by National Electric Products Corp. This clever material is in reality a raceway channel of zinc-treated steel, enclosing two ample copper conductors fashioned so as to provide a long slot into which a plug or current tap may be inserted. These copper conductors are protected by a strip of bakelite. Two longitudinal grooves are cut into the bakelite so that in seeking to find an opening for plugging in, all that is needed is to place the prongs of the plug along the groove, slide it along to one of the numerous pairs of openings. The openings are provided at 6 in. intervals along the strip.

The strip is of the same depth as the ordinary baseboard and is meant for installation in the baseboard assembly. By removing the capping, the plug-in strip may be run on top of the baseboard, and the capping replaced on top of the strip. Or it may be embedded in the plaster as a moulding at any desired height. In a breakfast room it may be inserted between sections of a chair rail so as to be at a convenient height for reaching from any part of the table. Tinted to the match of the walls or woodwork of a room it becomes inconspicuous. Accompanying illustrations show some applications and the construction of the strip itself.

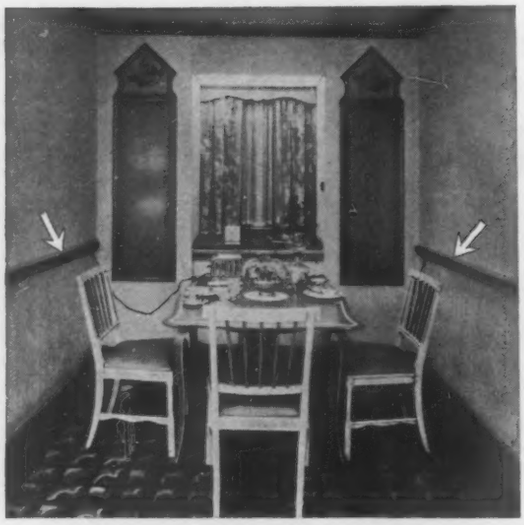
Six feet of the strip, with openings at 6 in. intervals, is regarded as one outlet under the 1935 code interpretation rendered the manufacturers. Diversity, because the likelihood of a large number of devices being connected to any 6 ft. length is small, plus ample copper carrying capacity are justification for such an interpretation. The material can be installed in old houses, using the existing wiring to feed to the

A sectional view of the plug-in strip, actual size, showing the insulated copper feeders shaped to act as spring contacts anywhere along the strip. The bakelite cap is punched at 6 in. intervals to permit entry of a plug tap

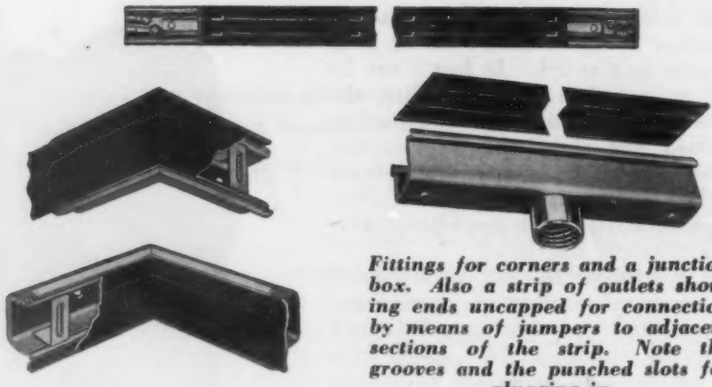


In an office the strip at the baseboard services office machines no matter where they are moved

In the kitchen the plug-in strip can be run at the convenient height under the cupboards for use of mixer and kitchen appliances at any position needed. Appliances need not be crowded near the single kitchen convenience outlet, awaiting their turn



Breakfast rooms often appreciate a row of outlets, table high, so that appliances may be plugged in while the breakfaster is seated



Fittings for corners and a junction box. Also a strip of outlets showing ends uncapped for connection by means of jumpers to adjacent sections of the strip. Note the grooves and the punched slots for plugging in

strip. Or in new homes where circuit provision is made with the strip in mind, it can be installed with equally good results.

To the customer, or user, the strip has a large list of appealing features. The ability to move furniture anywhere and still have electricity available for lamps, fans, clocks, or other devices anywhere around a room; the elimination of long runs of cord; the use of shorter cords on lamps and appliances, in fact the bringing of electricity to the appliance rather than the appliance to the electricity, are some of its items of "sex appeal," especially to the housekeeper and home maker. With such an installation adequacy is practically assured far into the future, permanently.

Metal Mouldings

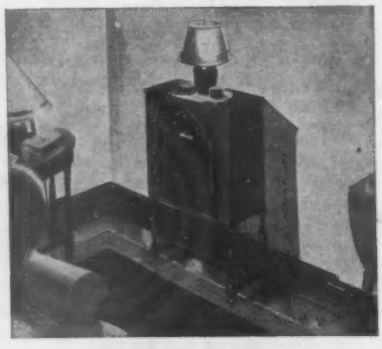
Makers of metal mouldings, too, have redesigned their product to make it more acceptable to the public and hence easier to sell to many who seek convenient use of electrical appliances. Smaller, with neat fittings to make the material conform to all sorts of obstructions in trim and contour of the room, the metal mouldings make ideal extensions. Yet the material is rugged enough to completely rewire an entire building with it, bringing to it circuits to feed the moulding at various locations.

Add-here

Another manufacturer has given a new product of revolutionary character what no other wiring has previously possessed, except in exposed fittings such as switchplates, namely, eye appeal. This new material is termed Add-here, by its makers, Bryant Electric Co. The material is a development of Charles Abbott, who for years has experimented with wiring methods seeking simpler, more saleable and easier-to-install wiring. With Add-here he has developed an all-rubber wiring material which is glued to walls or woodwork, and because of its flexibility can be made to conform to all kinds and conditions of interior trim. The material is finished in several typical wall finish shades, or may be painted to match the interior finish.

One extremely clever device of this line is a pendant outlet assembly that resembles an old time bell cord. It is suspended freely from the picture moulding and thus can supply electricity to clocks, to lights or boudoir appliances from the ceiling rather than the floor, thus keeping connecting cords away from the floor.

An additional feature that will appeal to renters is that the material can be installed at one location, and later removed when moving, and reinstalled in modified form at new premises. So wiring convenience, with this, becomes in a sense portable, even as the appliance is portable.



Inconspicuous X-tension duct, a small metal moulding, makes neat extensions from an outlet to serve an appliance or radio more neatly and safely than cord

All of the materials and devices described in these pages are installed only by qualified electricians and are not of that type of makeshift which only adds to the overload by piling more outlets on already crowded circuits. The real hope that lies in these developments is that by the use of thermal protective switches and heavier bus runs sufficient taps for short runs can be made to create new outlets, on ample copper carrying capacity, with safety as well as convenience.

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...in Western Manufacturing

Switches Now Shown By Traveling Truck Display

EMBODYING an interesting innovation in the merchandising of electrical control equipment is the display coach put on the road last month by the Square D Company, Inc., of Los Angeles in order to bring the most important items in the company's line to the dealer's door. The idea behind the plan, according to A. A. Schueler, sales manager of the Square D Company, is to familiarize the dealer with the company's products.

The sides and the top of the coach expand when the coach is being used as a display room. The height of the interior with the top down is 69 inches; with the top up the height is 86 inches. With the sides closed the interior width

Exterior of Square D Company's display coach with the sides and roof expanded. The many windows in the roof and sides afford a maximum of light on the inside

Interior of the display coach. In this view, looking toward the front of the coach the roof and walls have been expanded, providing a practical and complete showroom. Note the overhead lights and the steel filing cabinet

is 60 inches and with the sides expanded, 106 inches. Over-all dimensions inside are 101½ inches wide, 108 inches long and 86 inches high, providing ample space for display purposes. The top and side sections are operated either from the motor or with a crank.

Contained in the coach is a filing cabinet complete with literature and dealer promotional material. Effectively displayed on the walls of the coach are safety switches, meter switches, panelettes, circuit breakers, panel boards and other items manufactured by us and commonly stocked by electrical control equipment dealers. Overhead lighting is provided in the coach with current taken from the battery or from any convenient 110-volt outlet.

Skipper of the coach is Richard Russel, a junior salesman who will be accompanied by a salesman familiar with the particular territory through which the truck is routed.

The first leg of a proposed nine months' tour began on Nov. 1, with a swing through San Diego, the Imperial Valley, San Bernardino and the citrus belt. Anaheim, Long Beach, San Pedro, Santa Monica, Ventura and Santa Barbara were the next cities to be visited. Then will come San Francisco and the bay region, contacting coast towns enroute, also covering northern California points and the San Joaquin Valley. Arizona, Texas, New Mexico, Colorado, Utah, Oregon and Washington are included in the itinerary which, at its conclusion, will have carried the coach through the 11 western states and Texas.

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Filters Designed to Reduce Radio Trouble

Active interest of the utility company in the elimination of radio interference arises not so much from a direct obligation of the company to the radio listener as from a desire to encourage the use of radios which contribute an annual additional revenue to power companies of approximately $15 per year per customer.

Although small appliances produce the majority of the interference, the power lines themselves are blamed for most of the trouble, and the utility company realizes that it is to its own best interest to advise its customers of the proper manner in which to eliminate or reduce to a minimum the disturbances.

For preventing high frequency disturbances from entering a radio, the interference may best be eliminated at its source by the use of a specially built-up filter applied to the power line, close to the offending appliance. In other cases, it is merely necessary to prevent the interference from entering the radio through the power line by plugging into the line near the radio a ready-built line filter.

A line of filter equipment which has interesting possibilities for use at the disturbance-producing appliance or at the radio has been placed on the market by the J. W. Miller Company, Los Angeles manufacturer of radio equipment. Where it is impossible or impractical to eliminate the interference at its source, Miller engineers advise the use of the line filter that employs both inductance and capacity filtering at the radio receiver. A compact unit may be installed readily on any broadcast, short-wave or all-wave receiver by connecting in the line and attaching a single ground wire. Special duo-lateral wound chokes are used in the line filter, with oil impregnated paper dielectric condensers.

For use in special installations, particularly where it is possible to apply a filter at the source of interference, Miller engineers advise the use of the newly developed duo-lateral wound choke, which is made available in various sizes from 2 to 20-ampere carrying capacity. Used with suitable condensers, the filter chokes may be applied to radio receivers, transmitters, vibrating and rotating machinery, mercury arc, mercury rectifiers and wherever it is desired to eliminate interference from either a.c. or d.c. supply lines. The duo-lateral wound chokes are especially recommended for filters in transmitter power supply circuits to prevent signal conduction through the supply lines.

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• ANNOUNCEMENT was made in November of the organization by the Welcome Meter Company, Pasadena, Calif., of Welcome Sales, Ltd., as the exclusive distributor for Welcome coin-operated timing meters and appliances. The office of the newly formed concern is at 3117 San Fernando Road, Los Angeles. The company was organized, according to E. J. Checkley of the Welcome Meter Company, to handle the increased demands for the company's products.

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...in Wiring Rules

Richmond Requires Three-Wire Services

THREE wire services, even for small cottages, will be required under a recent amendment to the electrical rules of the City of Richmond, Calif., according to Edward M. McLaughlin, electrical inspector. "Because of such small differences in material costs of subfeeder and service equipment between the present two-wire, No. 8 system, and the new three-wire, No. 10 system, and the possible installation economy of three-wire circuits rather than the present two-wire circuits, it is expected that service entrance equipment capacity will be doubled and branch circuit loading improved with not one cent of extra cost to the average home builder," says Mr. McLaughlin.

The new rule goes into effect Jan. 1. In his announcement to electrical contractors, Mr. McLaughlin pointed out that the National Electrical Code Section 405-d, page 31 of the 1933 edition, and section 405-c, of the 1935 edition, can be interpreted in such manner that where the local rules require more than two circuits, a three-wire service will be required. When not more than four circuits are concerned, this three-wire service may consist of three No. 10 wires and a three-pole solid neutral service switch and three No. 10 subfeeds. The ground wire remains No. 8. He then gives a table showing the number of branch circuits and floor areas supplied with the required service feeders, service switches and other feeders.

Concluding, he said, "The above changes have been found necessary in order to provide adequately for such equipment as refrigerators, ironers, washing machines, mixers, etc. As these loads are commonly located in kitchens and laundries, it is strongly recommended that in installing the three-wire system this area be split into two circuits or balanced across the wires of a three-wire branch circuit."

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• HAROLD L. GERBER, electrical inspector, Department of Electricity, San Francisco, was named secretary-treasurer of the Southwestern Section, International Association of Electrical Inspectors, by the board of directors following the death of Claude W. Mitchell. Mr. Gerber has been prominent in the affairs of the association during the past

several years. Arrangements with the Board of Fire Underwriters of the Pacific for continuing to handle the records and necessary office detail are to be continued and the official address of the secretary will continue to be 914 Merchants Exchange Building, San Francisco.

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• "THE PROPER USE OF SAFETY ENCLOSED SWITCHES," an address by W. J. Mahan, president last year of the International Association of Electrical Inspectors, has been published both in the International News Bulletin of the Association and in two articles appearing in "Electrical Wiring and Equipment" for July and August, 1935. It contains a fine analysis of this important problem.

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• A HANDBOOK OF INTERIOR WIRING DESIGN for architects, consulting engineers, general and electrical contractors and others is now in preparation by a joint industry committee under the chairmanship of E. A. Brand, Buffalo. The handbook is that described by Arthur Abbott on his visit to the Pacific Coast last year. A program for dissemination of the manual after it is published is also being worked up as a part of an industry-wide campaign for improving wiring.

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...in the Motor Shop

Airplanes Aid in Rush Motor Repair Job

WHEN the 900 horsepower, Type CW hoist motor, weighing 17,000 pounds, was received at the Westinghouse Emeryville Service Shop, at 10 p.m., Thursday, Sept. 19, from Diamond Match Co., it meant expensive shutdown unless the rewinding could be rushed through at record speed.

After inspection to determine the amount of damage, East Pittsburgh headquarters were telegraphed for a complete set of both stator and rotor coils.

As it was necessary that this motor be repaired and returned to service as soon as possible, the repair parts, weighing 2,700 pounds, were shipped by airplane from East Pittsburgh to Oakland. The shipment was too heavy for one plane, nor could any of the planes for normal service between East Pittsburgh and Cleveland handle the parts. Consequently, two special planes were put into service between East Pittsburgh and Cleveland. From Cleveland to Oakland, which was handled by the United Air Lines, three planes were required. The first batch of stator coils

Loading part of the 2,700 pound shipment of motor parts which were rushed by air from Westinghouse's East Pittsburgh works to California for repair of 900 hp. hoist motor. Express charges were $2,607

were received in the Emeryville shop Monday morning, Sept. 23, at 9:25. The balance of the stator coils arrived Monday afternoon, and the rotor coils were received in the shop Tuesday morning, Sept. 24, at 9:30 a.m. In each case the express company had a special truck to meet the plane and bring the shipment direct to the shop. Although the Oakland airport is about 15 miles from the Westinghouse shop, delivery was made in less than thirty minutes after arrival of the plane.

After both stator and rotor were rewound, and the broken bracket repaired by welding and remachining, the motor left the Emeryville shop at 4:30 p.m., Sept. 27, arriving at the Diamond Match Co. plant at 6:30 a.m. on Sept. 28. It was placed in service Saturday afternoon, doing its normal job of hoisting logs, just 8 days later.

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• PHIL ROBBINS, motor specialist of Santa Rosa, Calif., now paints his rewound motors a dark maroon color rather than the customary gray or black. This gives the work turned out by his shop a distinctive characteristic which is proving to be an advertisement of his fine type of workmanship.

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Exterior of the world's largest and most powerful diesel-electric locomotive which pulls the Santa Fe's "Chief" from Los Angeles to Chicago at speeds as high as 100 m.p.h.

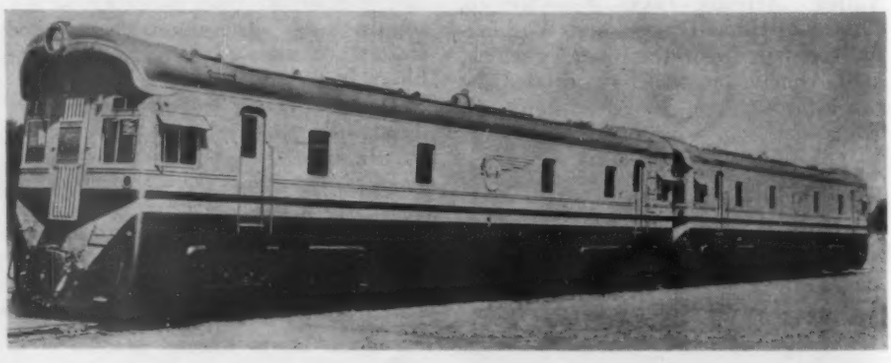
...in Engineering

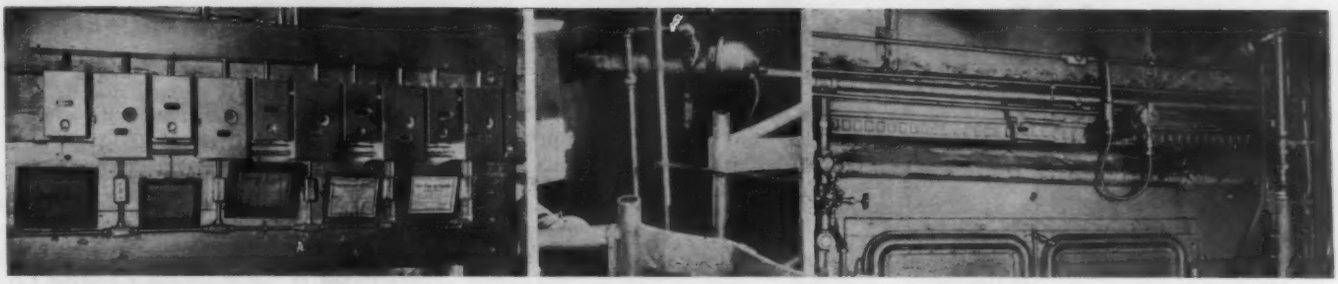
Diesel-Electric Locomotive Pulls Santa Fe's "Chief"

Illustrative of the trend in locomotive equipment for American railway service is the new 3,600-hp. diesel-electric locomotive recently put into service by the Atchison, Topeka & Santa Fe Railway. Cutting the former schedule over 15 hours the locomotive hauling a standard train made the 2,228-mile trip from Los Angeles to Chicago in 39 hours and 34 min., a new record. This largest and most powerful diesel-electric locomotive is typical of the streamline age, its maximum safe operating speed being set at 98 miles per hour.

The performance of this new type of locomotive has, in the opinion of many engineers, definitely sidetracked possibilities of main line electrification particularly in the relatively low traffic areas characteristic of the West. Practically all of the advantages of electric locomotive operation are realized with the diesel-electric combination without the investment of substations, trolleys, and generating stations.

A multiple unit of two identical sections, the new locomotive weighs 240 tons and is approximately 127 ft. long. Each section has two 900-hp., Winton V-type, 12-cylinder, high-compression, two-cycle oil engines located at either end of the cab. Each generator drives a direct-connected generator with a specially wound exciter by means of which the voltage of the main generator can be regulated to maintain full output of the engine through almost any desired locomotive speed. With this form of generator all regulation is inherent, the required characteristics being designed into the machine so that no wearing parts will affect its adjustment. Four traction motors take the full output of the two 900-hp. engines in each section. Motors are of the geared commutating-pole type with provisions for ventilating air circulation for cooling. As the generators located at each end of the cab supply two adjacent traction mo-





Left—Smoke alarm unit controls are mounted in a central location for accessibility. Center—Light source for smoke alarm in the stack showing the compressed air piping for blowing soot away from lamp. Right—Smoke alarm photronic cell mounted on the boiler enables immediate change of combustion conditions by the operator if smoking starts. The cell is mounted away from the direct heat and the mounting facilitates replacement and cleaning

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tors, power losses are minimized and flexibility of operation increased. The control for the locomotive is extremely simple and can be obtained from either end of each section. Speeds are governed by the output of the engine, the throttle control automatically exciting the generator field to coordinate the engine output and generator output through the speed range. Only four motor contactors are used to take the output of the generator to the two traction motors and one of these contactors is used to cushion the transfer from one motor combination to the other. Field shunting of the traction motors permits full utilization of the engine output over a wider range of locomotive speed. One five-button control and one five-button lighting switch give the engineer complete control of the locomotive at the operating position. Provision is made for the control of multiple-unit operation also.

An additional auxiliary diesel engine engine in the central part of the cab drives through V belts a 150-cu.ft. air compressor and a traction motor blower set as well as a direct-connected auxiliary generator for charging batteries, for operation of lights and other auxiliaries. Electric starting of all engines is provided by this battery.

High termal efficiencies have made the diesel-electric locomotive a vital part of modern railway motive power equipment. The fuel consumption of the engine ranges from 0.38 to 0.43 lb. of fuel per brake horsepower-hour with a fuel oil of 19,500 B.t.u. per pound. This rate of fuel consumption corresponds to an engine thermal efficiency of from 30 to 35 per cent as compared with 5 to 7 per cent efficiency of modern steam locomotives. The electric drive, with generators at an overall efficiency of 93 per cent at normal load and traction motors with an overall efficiency including gears of 90 per cent, provides a resultant over-all transmission efficiency of 84 per cent, a figure which no other type of transmission will give with the flexibility that is obtained with the electric drive.

The locomotive is extremely modern in appearance, streamlining have been obtained by modifying the cab construction and by specially shaping the ends of the locomotive. Flowing steel "skirts" with removable sections cover the wheels and underbody and the color scheme of black and cobalt with trimmings in blue, golden olive and scarlet enhance its modern attractive appearance. The locomotive was built by the Electro-Motive Corp., powered by Winton oil engines and equipped with General Electric electrical equipment.

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Smoke Alarm Units Mounted in Boilers

Close control of combustion with the attendant smoke elimination has been made possible with the recent completion of a program of plant improvement by the Seattle Gas Co., according to James F. Pollard, vice-president and general manager. This move has improved both operations and public goodwill, the former appeals to the City Council for removal of the plant from the north shore of Lake Union having been supplanted by a friendly attitude on the part of nearby residents.

The effort on the part of the Seattle Gas Co. to meet the objections to the smoke nuisance began several years ago with the installation of a Photronic "electric-eye" smoke alarm on the 70-ft. stack then in use. Records of smoke emission obtained then led to the construction of a larger 150-ft. stack. Finally, it was decided to provide the closest possible control of smoke emission by installing Weston smoke alarm units, not only on the stack itself, but on each of the nine 150-hp. boilers at the plant. These units are of the latest type in which smoke passing between the light source and the light-sensitive cell causes a change in current from the cell. This change in current operates a relay which sounds an alarm.

Three of these boilers are oil-fired, and the balance are equipped with stokers for solid fuel. Tar is also burned in these boilers. By mounting a smoke alarm immediately above each boiler, it became possible to correct the fires immediately, before a column of smoke had reached the stack. Since the installation of this equipment, the smoke emission has been reduced seven-eighths to an average of 0.94 min. an hour.

From an engineering standpoint the installation includes several unusual features such as special mountings to protect the Photronic cells from boiler heat, the use of a compressed air jet on the Photronic cell and light source installed in the stack to prevent them from gathering soot. The improvement was capitalized to the utmost by telling the people of Seattle about it through advertising and inviting them to visit the plant. In this way the residents of the city were convinced that the company not only was trying to operate with as little inconvenience to the city as possible but also was progressive in adapting new developments to accomplish this end.

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...in Contemporary Literature

ELECTRICAL MEASUREMENTS, by H. Cobden Turner and E. H. W. Banner. Published in Instrument Publishing Co., Pittsburgh, Pa. Fabricoid bound; 6x9 in.; 350 pages; illustrated. Price $4.50.

The subject matter of this book deals in detail with the common measurements of current, voltage power and resistance and the application of electrical devices to the measurement of speed, temperature, illumination, etc., which are growing increasingly important in commercial fields. In addition to dealing with specific types of electrical measuring equipment, the book stresses the application of measuring devices particularly with reference to accuracy and the limits thereof.

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THE METAL CLEANING HANDBOOK—A book prepared by the Magnus Chemical Co. and written by Robert W. Mitchell, Ph.D., gives complete technical data and practical symposium of methods for cleaning metals in all types of applications. Profusely illustrated, including numerous diagrams and formula, the book contains over 200 pages of data on applications and use of cleaning compounds, etc. The retail price is $1.00.

News of Note + + +

Central Valley Project Funds Reallocated

Reallocation has been made of the $15,000,000 of work relief funds alloted to the Bureau of Reclamation for the construction of the Central Valley Water Project in California. Under the terms of the original allotment, the money was to have been used in the construction of the Friant Dam on the San Joaquin River and the canals leading from it to areas in the southern San Joaquin Valley where the underground water supply has been or is being exhausted.

Under the provisions of the reallocation, the Bureau of Reclamation is empowered to proceed in what it considers the most economical manner of constructing the project, subject only to a limitation which prohibits encumbering by contract funds in excess of the $15,000,000 which now is available for the work. Under this plan the allocation would be spent as follows: excavation and preparation for the building of Kennet Dam on the Sacramento River, $500,000; beginning relocation and reconstruction of railroad and highway to be flooded by Kennett reservoir, $5,000,000; construction of the Contra Costa Conduit Canal, $2,500,000; purchase of water right in San Joaquin Valley, $2,000,000; construction of Friant Dam on the San Joaquin River, $3,500,000; beginning construction of the Madera canal, $500,000, and beginning construction of the Friant-Kern canal, $1,000,000.

Actual construction will be in charge of Walker R. Young, Bureau of Reclamation construction engineer, who was in charge of building Boulder Dam. Temporary offices have been opened at Redding, Calif., and survey crews are at work in the Sacramento River Canyon.

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REA Loans Made to Idaho Organization

Two loans have been made by the Rural Electrification Administration to the Northern Idaho Rural Electrical Rehabilitation Association, Inc., a cooperative organization with headquarters at Naples, Idaho, for line construction in Bonner and Boundary Counties. The loans follow REA's plan of a twenty-year amortization period with interest at 3 per cent.

One contract calls for $35,750 to build 35 miles of line serving 72 customers; the other for $54,000 for 40 miles of line reaching 248 customers. Because the territory served is sparsely settled with an average of only 4.3 customers per mile of line, the rate base for the first 100 kw.-hr. per month will be $6.60, the highest yet approved by REA. Energy for the two lines will be supplied at wholesale by the Mountain States Power Co.

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Utah Power & Light May Build Steam Plant

Preliminary studies looking toward the possible construction of a new steam power plant by the Utah Power & Light Co. to meet increasing demands for electric service have resulted in the filing of two applications to appropriate water for steam boiler and condenser cooling purposes with the Utah state engineer. One application covers 50 additional sec.-ft. of water from the Jordan River adjacent to the company's present Jordan steam plant. The second calls for 200 sec.-ft. from the Provo River, just below the company's present Olmsted hydro plant near Provo.

The company's present generating capacity is being taxed severely due to a succession of dry years in the intermountain region, resulting in the almost complete drawdown of the company's famous Bear River reservoir.

●

• VOTERS OF SUSANVILLE, Calif., defeated a proposed $75,000 bond issue for the construction of a municipal power plant in an election Dec. 5, 1935. The plant, to be constructed with federal funds, was to receive a grant of $45,000. The city is served by the Lassen Electric Co.

●

Greeting

Thus the Washington Water Power Co. at Spokane extended its good wishes to the people of the community by means of an electrical greeting card atop its building

Contract Signed For Wyoming Dam and Plant

Contract for the construction of the Seminoe Dam and power plant of the Casper-Alcova Reclamation project in Wyoming has been awarded to a firm composed of the Morrison-Knudsen Co., Inc., Boise, the Utah Construction Co., Ogden, and Winston Brothers Co. of Minneapolis, on a bid of $2,759,804.50. The Seminoe Dam will be a concrete arch-type structure with a crest 540 ft. long and a height of 260 ft. from the foundation. It is located on the North Platte River near Parko, Wyo.

The power plant will contain three 14,000 hp. units. Three 120-in. diameter power penstocks and two 72-in. diameter regulating outlet pipes will be embedded in the concrete at the dam. Storage will be 1,020,000 acre-ft. for regulation of the river, power generation and use on 35,000 acres to be reclaimed in the vicinity of Casper, Wyo.

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San Joaquin Valuation Suit Nears Completion

Evaluation of the Fresno distribution system of the San Joaquin Light & Power Corp. by the California Railroad Commission neared completion when that body, sitting en banc, heard final arguments on the case on Dec. 20.

A marked disparity in the values placed on the system by the city and by the power company developed during the arguments. The City of Fresno which initiated the valuation proceedings in June, 1933, contends that the distribution system is only worth $1,710,000, including $160,000 as severance damage. The company, contending that the market value of the system should be based on its earning capacity and also that ample allowance should be made for severance, placed a value of $4,664,000 on the system.

●

• INDICATIVE OF a definite business upturn the Washington Water Power Co. has been adding new customers to its Spokane system at the rate of 100 per month since May 1. A total of 905 new customers was added during the first eleven months of 1935 with the majority taking service during the past six months.

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• OHIO BRASS CO. has announced that its insulator plant at Barberton, Ohio, closed for some weeks due to labor difficulties, has returned to production. On Dec. 23, 1935, all departments had resumed normal operation.

Los Angeles Announces Rate Reductions

The Los Angeles Board of Water and Power Commissioners announced Dec. 18 that electric service rate reductions calculated to save consumers $1,627,000 a year will become effective shortly after the first of the new year. The board approved the recommendation of E. F. Scattergood, chief engineer and general manager of the Bureau of Power and Light, for reducing rates.

A board resolution incorporating the new rate ordinance will be submitted to the city council immediately. The date of the new schedule has been fixed as of February 1, 1936, to allow for publication of the new rate ordinance thirty days prior to its effective date, as required by law. All regular bills rendered on or after February 1, 1936, power officials said, will cover service rendered at the new rates back to the meter-reading date of the preceding month.

Reductions included in the total represent a cut of 10 per cent in the anticipated gross annual revenues of approximately $16,350,000 for the fiscal year ending June 30, 1936, according to the board. The total includes a flat 10 per cent cut of $154,000 in street-lighting service; a reduction of $446,000 per year for all classes of residential and domestic users of current and a reduction of $1,007,000 a year for general lighting and power, including commercial, governmental and industrial services.

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San Francisco Considers Hetch Hetchy Power Problem

Four plans for the distribution of Hetch Hetchy power by the city of San Francisco, in order to conform with rulings laid down by Secretary of the Interior Ickes, have been prepared by the city's public utilities commission and submitted to the board of supervisors. The ruling of the federal official held that the city was violating the terms of the Raker act, under which Congress granted it certain water rights in Yosemite National Park, by disposing of its power to Pacific Gas and Electric Co. through an agency agreement.

Three of the plans contemplate a continuation of the agency agreement as regards the present output of the 80,000-kw. Moccasin Creek plant, but require the erection of a 20,000-kw. hydro plant at Red Mountain Bar, the building of a Diesel standby plant in San Francisco, construction of 45 miles of high tension line from Newark to the city limits and two substations. They contemplate the purchase of a portion of the existing distribution system of the Pacific Gas and Electric Co. Revenues based on a proposed federal grant of 45 per cent of the new construction costs and a rate approximately 10 per cent lower than those charged by the private company are estimated to return a small net income after depreciation and bond retirement charges.

The fourth plan contemplates distribution of the full output of the city's existing stations. It suggests that the present agency contract be continued with the company taking power at its Newark substation at 75 per cent load factor and the city in turn taking power from the company inside the city limits at 43 per cent load factor, the company absorbing the difference in the total kilowatt-hours. Standby service would be purchased from the company. This plan would involve the purchase of a large portion of the San Francisco distribution system of the company at an estimated cost of $16,575,000.

Methods of financing studied include both general obligation bonds and revenue bonds although the latter cannot be issued without a charter amendment (already twice defeated). Loss of taxes on the company's property which would be taken over is estimated at $290,000 annually. In addition, the present agency agreement gives the city a net income of approximately $2,000,000 annually.

All of the plans must be submitted to the Interior Department for comment and approval and also must finally come before the public for vote.

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• CHANGES in the administrative personnel of the Electrical Development League of Southern California have been announced by E. F. Hockensmith, executive manager. Will H. Davie of Allied Industries, Inc., representing the electrical manufacturers agents on the league board of trustees, has resigned because of the press of private business. He is succeeded as a trustee by Frank J. Airey of the Frank Airey Co. A. E. Hitchner of the Westinghouse Electric & Manufacturing Co., representative of the electrical manufacturers on the board of trustees, has been named to succeed Mr. Davie as vice-president of the league.

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• LOS ANGELES BUREAU of Power & Light has taken steps to provide proper housing for the 50 employees and their families which will handle the operation of the Boulder Dam power plant through the purchase of housing facilities from Six Companies, Inc., contractors for the dam, and of Babcock & Wilcox. The properties, located at Boulder City, include eleven Six Company buildings and 14 B. & W. buildings.

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Three Power Districts Proposed in Oregon

Three proposals for the formation of "people's utility districts" in Oregon have made their appearance in the past month. Preliminary petitions on all three have been filed and hearings on two before the state Hydroelectric Commission have been completed. These two await the report of the commission which must be filed within 120 days of the last hearing, which was in the middle of December in both instances, before the organizers proceed to determine the feasibility of their project and circulate a second petition directing the commission to call an election to vote whether or not the district shall be formed.

The first of these districts comprises the major part of the agricultural area of Linn County in the Willamette Valley in which the city of Albany is situated. Most of this territory is now served by Mountain States Power Co. of that city. Hearings were completed on Dec. 7. Both preliminary and final petitions require the names of voters to the extent of 5 per cent of the number who cast their vote for justice of the supreme court at the last preceding biennial election.

The second district comprises Marion County in which the state capitol, Salem, is located, and which is served by Portland General Electric Co., Mountain States Power Co., Yamhill Electric Co., and two smaller utilities. Hearings on this were completed Dec. 16. In all three cases the contention of the organizers is that the districts should be formed so as to be in a position to secure power from the federal development at Bonneville.

The largest of the three is the so-called Northwest Oregon Bonneville Peoples' Utility District, including portions of the counties of Clackamas, Clatsop, Columbia, Lincoln, Polk, Washington and Yamhill, embracing 45 incorporated cities and rich agricultural areas having a total estimated population of 150,000. Eight utility companies now serve the territory comprising the proposed district, namely, Portland General Electric Co., Yamhill Electric Co., Molalla Electric Co., Northwestern Electric Co., Pacific Power & Light Co., West Coast Power Co., Oregon Gas & Electric Co., and Mountain States Power Co. The cities of Forest Grove in Washington County, Canby in Clackamas County, and McMinnville in Yamhill County, served by municipal power systems, are not included in the districts. Seven hearings on this petition are to be held in January in central locations in each county.

Three utility districts are now in full force and effect in the state though none have proceeded far toward operating their own power systems. One is a district around Tillamook in Tillamook County on the coast, served by Mountain States Power Co. One is a small agricultural area east of Astoria, Clatsop County, called the Wickiup District, served by the Knappa-Svenson Co. The third is also a small agricultural area in the mountains west of Eugene in Lane County known as the Triangle Lake district, not now served, presumably because of its small load possibilities and complete isolation from other centers of population to the east and west.

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Contract Let For Imperial Dam

Contract for the Imperial Dam and desilting works which will serve as diversion works for the All-American Canal has been let to a firm composed of the Morrison-Knudsen Co., Boise, the Utah Construction Co., Ogden, and Winston Brothers Construction Co. of Minneapolis, on a bid of $4,374,240.60. Unique in construction, the desilting works have been designed to remove from the waters of the Colorado River their burden of silt. It is estimated that through provision of clear water in the All-American Canal irrigators in the Imperial Valley of California will be saved $1,000,000 a year in the cost of maintaining their canal system. Dredging and cleaning canals of silt deposits comprise the principal part of the present maintenance cost.

Water will be diverted by the dam into the desilting works which will consist of six settling basins, each 269 ft. wide and 769 ft. long, arranged in pairs. Each pair of settling basins will handle a maximum flow of 2,000 sec.-ft. of water. The silt collected in the basins will be removed by 72 rotary-type scrapers, each 125 ft. in diameter. The scrapers will force the silt into collecting trenches from which it will be flushed in the river below the dam through sluiceways 3,000 ft. long.

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• SOLUTION of the power supply system for rail traffic over the San Francisco-Oakland bridge has been suggested by the provision of dual service to permit operation of electric trains of both the Southern Pacific and the Key Route. The former system operates at 1,200 volts and the latter at 600. Six hundred-volt service would be supplied through a third rail and 1,200-volt service by means of a trolley system.

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• SOUTHERN SIERRAS POWER CO. won first place in its class in the National Fleet Safety Contest conducted by the Vehicle Section of the National Safety Council for the last fiscal year.

Seattle Competitive Tactics Scored by Commission

Steps to eliminate "unfair and discriminatory practices," which it contends are being indulged in in Seattle by the Puget Sound Power & Light Co. and the Seatte City Light Department, will be taken by the Washington Department of Public Works.

The principal charge is that the two utilities permit special discounts, amounting in some instances to as much as 40 per cent plus 10 per cent, thus allowing certain operators to "garner net profits of not less than $165,000 annually."

The department, having no jurisdiction over City Light, consequently filed a formal complaint against the Puget Sound Co. only, but addressed a letter to the Seattle City Council advising it the same purported discriminatory practices were being indulged in and suggesting that the council take action to eliminate the practices.

The special discounts, according to Fred J. Schaaf, director of the Department of Public Service, were made to thirty-nine operators of 342 apartment houses and ten operators of 999 business establishments, whose combined billings, if properly computed, would return approximately $1,000,000 a year to the utilities.

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• PAYMENT OF $3,150,000 as the initial installment on a tax bill of $3,650,000, the first under the newly operative Riley-Stewart plan, has been made by the Southern California Edison Co., Ltd., according to an announcement by Harry J. Bauer, president. A second installment of $500,000 will be made at a later date. The company's tax payment, at the rate of $10,000 for every day in the year, in conformity with the tax payment plan, is made directly to the county, municipal and district governments in the eleven southern and central counties of California served by the company, rather than to the state directly as heretofore.

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• THE COEUR D'ALENE City Council has appropriated $877 to carry an appeal to the circuit court against the injunction granted by federal Judge C. C. Cavanah of Boise, upon application of the Washington Water Power Co., preventing the city from carrying out its plan to borrow funds from the PWA to construct municipal water and electric systems. The appropriation is for the printing of testimony from the early suits. Although similar suits are expected to reach the Supreme Court before that of the city of Coeur d'Alene it was felt that the appeal should be carried to the circuit court in order to keep the suit alive.

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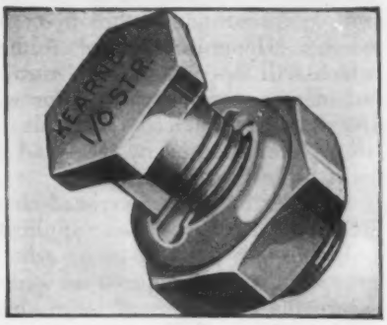

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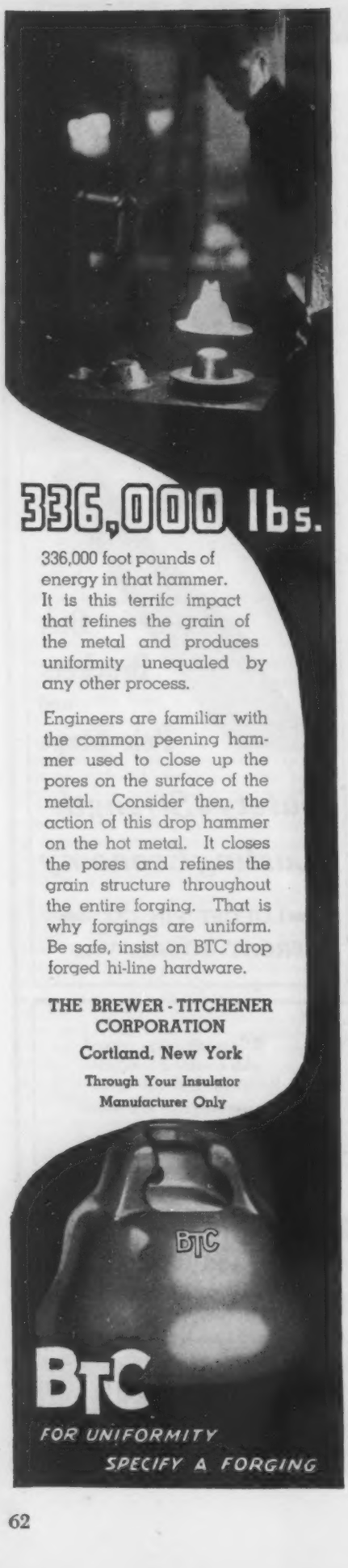
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R.E.A. to Finance Farm Home Wiring

Wiring of houses and other farm buildings for electricity will be financed by the Rural Electrification Administration in areas where rural line construction is making electricity available, according to an announcement by REA Administrator Morris L. Cooke. Financing of appliances, as heretofore, will continue under the direction of Electric Home and Farm Authority, which will operate in both rural and urban areas. Financial aid for wiring installations will be available both along lines financed by REA and those built by private capital.

In order to reduce overhead charges, REA will receive loan applications only through local sponsors who will group individual requests in order to secure the economies of large volume. Administrator Cooke points out that "the cost of wiring can be reduced substantially by cooperative action, resulting in a contractor wiring a hundred or more farmsteads under a single contract rather than bidding on each individual farm."

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Portland to Vote on Acquiring Northwestern

Two separate elections a year apart have been provided for by the city council of Portland to determine if and on what basis the city shall acquire the properties of the Northwestern Electric Co. at the expiration of its franchise, November, 1937. At the first election, the time of the special state election, January 31, 1936, the voters will be asked to express themselves yes or no on a proposal to levy a special tax of $50,000 to pay the expenses of appraisal of the company's properties, looking toward a determination of how much of these properties might be purchased and at what price.

If this proposal is voted in the affirmative, such investigation is to be carried out and the final proposal in definite terms will be placed before the people at a special election in February, 1937, with no other issue on the ballot.

This action was taken by the council early in December following four afternoon hearings at which proponents and opponents expressed themselves. The issue was forced largely by two councilmen known to be favorable to municipal ownership backed by the municipal ownership group in the city.

The solution of the problem reached by the council met little opposition from any source since it follows out a provision in the company's franchise that the city shall have the option to purchase the company's properties at a value to be arbitrated on the expiration of the franchise. The company, looking upon this provision as a contractual obligation, not only did not protest but offered every assistance to the city in the investigation to be made if the electorate so votes. The Chamber of Commerce and other civic organizations, as well as individual business men acting as private citizens, were present at the hearing to urge that no half thought-out proposal be offered to the voters. This element insisted that when the actual proposal to purchase is presented for consideration of the voters, it be in definite terms with particular regard as to the exact properties to be purchased, the price to be paid therefor and the manner of financing the purchase.

The Northwestern Electric Co. serves about one-half the customers in 60 per cent of the serviceable area of the city (area of rivers and parks excluded). A recent reproduction valuation of all its properties in both Oregon and Washington reached approximately $21,000,000. An extensive steam heating system is supplied out of two of the company's steam plants and the operation of this system is closely integrated with the operation of the electric system. The proposal to purchase by the city may include the steam heating system.

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Sodium Vapor Lights Installed Near Seattle

A three-mile experimental stretch of sodium-vapor lighting on the Lakeview cut-off between South Tacoma and Fort Lewis, in Pierce county, Wash., the first installation of its kind in the Pacific Northwest, was turned in for the first time on December 1. Reports on the practicability have not been made but Lacey V. Murrow, director of the State Highway Department, stated "if the installation does prove satisfactory, other similar improvements will be made in foggy districts of the Puget Sound area."

This system, the cost of which has not been released for publication, was installed by the Puget Sound Power & Light Co. for the state highway department. Materials for the work were furnished by the General Electric Co. The job involves 10,000 lumen lamps staggered each 200-ft. along the new four-lane highway.

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• PERMISSION to consolidate the Nevada California Power Co., the Southern Sierras Power Co., and the Yuma Utilities Co. is requested in an application filed with the Securities and Exchange Commission. It is proposed to liquidate the three companies and place all electrical properties and facilities now owned and operated by them under the direct control of the Nevada California Electric Corp.

San Diego Fair Reopens Jan. 15 With Mobile Light

A RETURN engagement of San Diego's exposition has been booked beginning Jan. 15 for an eight months' run. In summarizing the $12,000,000 investment in community advertising which the California Pacific International Exposition proved to be, figures as to attendance are significant. From the viewpoint of the San Diego Consolidated Gas & Electric Co. the 1935 program was declared to be a fulfillment of all pre-exposition promises, and well worth the investment in time and money. The natural gas exhibit, in which this company had a part, was host to 200,000 interested visitors.

From the electrical standpoint the San Diego company contributed to the installation and maintenance of the House of Magic in the Palace of Electricity. This proved to be one of the most attractive exhibits in the exposition. An accurate count of guests attending the electrical demonstrations totaled 305,000 people. The total attendance at the fair for the period of its 1935 run was 4,750,000 people.

Scheduled for the second year's run are changes in lighting and the addition of a number of exhibits. A complete new lighting system, in which mobile or moving light will be used in colored waves up and down the buildings, is being installed for the feature attraction of this year's fair. Lighting, in the rich surroundings of gardens and buildings, during the past year's exposition was one of its outstanding characteristics.

H. O. Davis, consulting engineer, explained that lighting difficulties of the past season have ben eliminated. These included the problem of concealing lighting units, manufacture of proper colored lens and the difficulty of preventing lens from cracking due to intense heat.

The outdoor pipe organ is to be floodlighted and a new aurora borealis effect is to be mounted atop of it. In the Alcazar Gardens a firefly effect is being installed for night effect.

Practically all exhibits and the interiors of the buildings are being refurbished or completely changed and several new exhibits, particularly of the petroleum industry and the fishery industry, are being installed. Aviation also will have a big display.

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• EFFORTS FOR the formation of a municipal utility district for the distribution of electric power in the region surrounding Manteca in San Joaquin County, Calif., were defeated in an election held Dec. 17, 1935. The proposal lost by a vote of 618 "no" to 498 "yes."

• LOW WATER and cold weather in the Pacific Northwest resulted in the appropriation of $150,000 by the Seattle City Council for purchase of fuel to operate the Lake Union steam plant of the Seattle Light Department. In addition the Light Department purchased power to the extent of 14,000 kw. per day from the Tacoma Municipal system.

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• Westinghouse Electric & Manufacturing Co. will initiate its 50th Jubilee Year celebration with simultaneous employee meetings in all sections of the world on Jan. 8, at which ceremonies from the main plant at East Pittsburgh will be broadcast on the company's shortwave radio station. Specifically the meeting will celebrate the fiftieth anniversary of the granting of a charter to Westinghouse.

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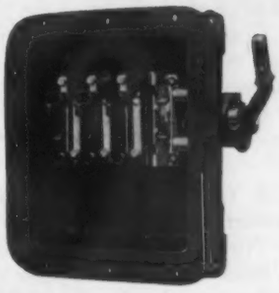
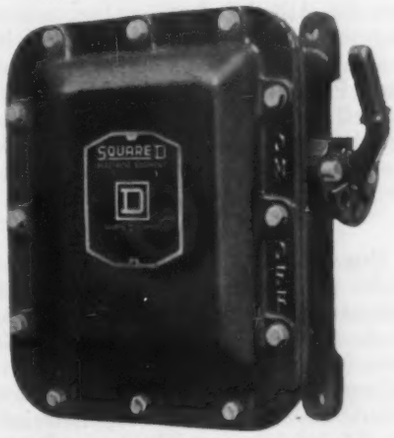
• TO ACQUAINT industrial electrical contractors, manufacturers, wholesalers and manufacturers' agents with the possibilities for increased business in industrial electrification with the advent of its new rates, the Pacific Gas and Electric Co. has been holding meetings in each of its divisions in which such business possibilities are to be found.

FOR *hazardous* LOCATIONS



Explosion proof switch, cover removed. Cover is held in place by heavy corrosion-proof bolts.



Enclosures of the Square D explosion proof safety switch are semi-steel castings, with carefully machined surfaces between box and cover; pipe threaded conduit holes at top and bottom with extra pads on both sides for drilling other conduit entrances.

EXPLOSION-PROOF SWITCHES BY SQUARE D

With the introduction of this new safety switch the Square D line of safety switches for special applications is now complete. First, weather-proof; second, dust-proof; third, water tight; and now, explosion-proof!

Explosion and fire hazards exist in practically every industrial plant; with industrial modernization programs in full swing, now is the ideal time to apply these explosion proof switches in such hazardous locations and initiate the protection that these switches afford.

The Square D explosion proof safety switch is built for single or double throw, not fusible, two and three pole, and is available in capacities from 30 to 200 amperes, 575 volts A.C., 600 volts D.C. This new Square D engineering development meets the requirements of the National Electric Code for hazardous locations—Class I, Group D, and all lower classifications.

If you want engineering assistance—

CALL IN A SQUARE D MAN

SQUARE D COMPANY
ELECTRICAL EQUIPMENT
INC.
LOS ANGELES · SAN FRANCISCO · DENVER · HOUSTON
SQUARE D COMPANY · DETROIT · MILWAUKEE

...about People

Frank W. Hall of G-E Dies in East

Frank W. Hall, manager of sales of the General Electric Company's Construction Material Division, and a progressive leader in the electrical industry for the past 40 years, died on Nov. 25 at Stamford, Conn. He was well known to the industry on the Pacific Coast. At the time of his death he was also a director of the General Electric Supply

FRANK W. HALL

Corp., the Trumbull Electric Mfg. Co., the Monowatt Corporation and the Rigid Steel Conduit Association.

His electrical career started with the Sprague Electric Co. in New York City in 1895. By 1918 he was commercial manager of the entire Sprague organization. In 1922 Mr. Hall came to Bridgeport as manager of Commodity Sales Division for the newly established Merchandise Department of the General Electric Co.

•

Mitchell, Inspector Secretary, Called

Claude W. Mitchell, electrical engineer for the Board of Fire Underwriters of the Pacific, after a lingering illness of more than a year, died at his home in Berkeley, Nov. 27. A graduate of the University of California, class of 1902, he had spent 30 years of his life with the Board of Fire Underwriters as its electrical engineer.

Since the formation of the electrical inspectors organization about 1925 he had been its secretary-treasurer. Traveling throughout the West he was known everywhere and has represented the West on many occasions on the National Electrical Code making body, the Electrical Committee.

Testimonial to the high regard in which he was held was the action of the Southwestern Section, International Association of Electrical Inspectors, at its San Diego convention, when, despite Mr. Mitchell's long illness and slight chance of recovery, the organization insisted on reelecting him secretary-treasurer and looked forward to the day when he would become president of the I.A.E.I.

•

J. E. Woodbridge, Noted Engineer Dies in California

Jonathan E. Woodbridge, widely known Pacific Coast consulting engineer, died in a hospital at San Mateo, Calif., Dec. 23, after an illness of five weeks. A native of Duluth, Minn., he came to the Pacific Coast from Schenectady, New York, in 1910.

Mr. Woodbridge was a graduate of Massachusetts Institute of Technology. From 1897 to 1900 he was editor of ELECTRICAL WORLD. Following that he was assistant to W. B. Potter, chief of the railway engineering department of General Electric Co.

He came to the Pacific Coast to direct the business of Ford, Bacon & Davis in this territory. Between 1910 and 1913 he served as chief engineer of the Sierra and San Francisco Power Co. and as consulting engineer for the Market Street Railway Co. He was a past president of the Engineers' Club of San Francisco.

•

• WILLIAM GREENFIELD, president of Allied Industries, Inc., died in San Francisco Nov. 20, 1935. Mr. Greenfield had been with the company since 1919, having previously been Pacific Coast manager of the Johns-Manville Co. for several years. Under his direction the Allied Industries, Inc., manufacturers' representatives, expanded its system of offices and warehouses to include Portland, Seattle and Los Angeles as well as San Francisco. Mr. Greenfield was a native of Woodburn, Iowa. He was active in industry affairs throughout his life.

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• HORACE T. ADAMS, pioneer motor dealer in San Francisco and president and manager of the Farnsworth Electric Works for the past 25 years, died at his home in Oakland Nov. 29. A mechanical engineer, Mr. Adams invented several devices used in the early motorization of industry, notably a removable pulley hub which was adaptable to all sizes of shafts. For ten years he was president of the Electric Motor Dealers' Assn. of Northern California and prominent in its activities.

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• CHARLES E. ADDIE, for many years connected with the public relations department of Public Service Co. of Colorado and an employee of that company for 32 years, died in Denver Nov. 8.

MWD Promotes Electrical Engineers

C. P. Weaver, superintendent of the operations division of the Metropolitan Water District, has been named transmission line engineer on the new Boulder Dam aqueduct power transmission line and telephone line. At the same time it was announced that B. H. Martin had been appointed to succeed Mr. Weaver as superintendent of operations with headquarters at Banning.

Mr. Weaver has been employed by the district for three years having supervised the construction and operation of all power and telephone lines, road and water lines. Prior to joining the district's staff he was employed for approximately 20 years on various projects of Stone & Webster. Mr. Martin also has been with the district for three years, prior to joining the aqueduct, having been in charge of substation construction for the City of Glendale, a period on the staff of the Los Angeles Bureau of Power and Light and some time in the employ of the Cities Service Corp. in the East.

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• E. F. MCNAUGHTON has been appointed to the position of director of research, formerly held by Walter W. Cooper, by Leon O. Whitsell, president of the California Railroad Commission. Mr. McNaughton graduated from the University of California in 1922 as an electrical engineer. He has been employed as an assistant engineer in the Railroad Commission since 1924. He will have charge of the presentation of rate adjustment matters coming before the Commission on behalf of the public.

•

• J. L. MARZLUFF, manager for the Puget Sound Power & Light Co. on Bainbridge Island, in Kitsap County, for the past three years, has been transferred to Renton, in King County, near Seattle, replacing Harvey Leach as Renton manager. Mr. Marzluff was replaced on Bainbridge Island by Wallace Joyce, formerly manager at Bothell, in King county.

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• GEORGE E. WHITWELL, vice-president of the Philadelphia Electric Co., and Merrill E. Skinner, assistant vice-president of the Niagara Hudson Power Corp., jointly have been awarded the James H. McGraw Medal for cooperation in recognition of the outstanding contribution they have made to the industry in initiating and organizing Better Light—Better Sight programs. The award was made at a dinner sponsored by the Edison Electric Institute and the Illuminating Engineering Society at the Hotel Biltmore in New York City, Dec. 10.

Jim Pollard Elected President of Seattle Gas

James F. Pollard, since 1930 vice-president and general manager of Seattle Gas Co., was elected to the presidency of that company by the board of directors in December. He succeeds Franklin T. Griffith who held this position during the same period of time and who resigned on recent completion of financial re-organization plans. Mr. Griffith came to the presidency of Seattle Gas Co. when that company was acquired by Pacific Northwest Public Service Co. in 1930, he being then the president of Pacific Northwest Public Service, predecessor of Portland Electric Power Co. The Pacific Northwest company sold Seattle Gas in November, 1932, and Mr. Griffith retained the presidency until now to complete the reorganization referred to. He takes the position of chairman of the board.

Mr. Pollard was brought to Seattle from California to manage the Seattle company when the Portland company acquired it. He was vice-president and general manager of the Coast Valleys Gas & Electric Co. at Salinas prior to its acquisition by Pacific Gas and Electric Co. and then managed it as a division of the latter company.

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• CHAD HULBURT has been named successor of the late Frank Bevan as display man for the Pacific Gas and Electric Co. Mr. Hulburt has been a display and advertising man for a number of years, having been connected with the display departments of The Emporium and City of Paris in San Francisco during the past eight years.

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• D. G. TYREE, manager of the investment department of the California Oregon Power Co., resigned to accept a position as legal advisor in the Portland office of the United States Bureau of Reclamation. Thus he returned to the office from which he came to the California Oregon company in 1923 to take the position of assistant to Paul B. McKee, then general manager. In the following year he was made secretary of the company, which position he held until the period of preferred stock sales when he was made manager of the investment department.

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• GEORGE A. HUGHES, president of the Edison General Electric Appliance Co., Chicago, so-called "Father of the Electric Range," spent several days on the Pacific Coast during the past month renewing friendships and ably preaching the gospel of electric cookery.

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• CARL A. HEINZE, consulting electrical engineer of Los Angeles, heads the new body of officers of the L. A. Engineer's Club. Serving with him are E. W. Rockwell of the Metropolitan Water District's engineering staff and G. D. LaMoree, well-known electrical engineer of that city.

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• HAROLD H. CAKE, General Electric Supply Co., Los Angeles, has resigned to become associated with J. E. Haseltine Co., Portland. G. L. Wilder, Locke Insulator Corp.'s representative in Salt Lake City, will replace Mr. Cake as transmission specialist with the General Electric Supply Co. in Los Angeles.

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• ESTHER BENNINGTON, home economist for the Southern Sierras Power Co. at Calexico and El Centro, spent a week at the Westinghouse "Home of Tomorrow" at Mansfield, Ohio, and visited the Nela Park Home Appliance Exhibit at Cleveland. Mrs. Bennington is the wife of William Bennington, agent for the company at Calexico.

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• ARTHUR D. STEWART, Butte, Mont., manager of the Westinghouse Electric & Mfg. Co., died in that city on Nov. 29, following a throat operation. A graduated electrical engineer from Washington State College he had been located at Butte for the past nineteen years.

Piscatorial Proof

Don C. Ray, P.G. & E. manager of public relations, contends that he is no fisherman. However someone caught him with the evidence: 5 rainbows, 5 pounds

We Are In Business

TO GIVE

SERVICE

GEORGE E. HONN COMPANY

420 Market St., San Francisco, Cal.

Manufacturers Representatives for

Tree Trimming Equipment
- Bartlett Manufacturing Co.

Friction and Rubber Tapes
- Clifton Manufacturing Co.

Pyrex Insulators
- Corning Glass Works

Transformers
- Gardner Electric Mfg. Co. *Power and Distribution Transformers*
- Lee Skipwith & Co. *Niagara-Air Insulated Current Transformers*

Poles and Cross Arms
- Mineralized-Cell Wood Preserving Co.
- Pacific Cross Arm Corp.

Fuses, Cutouts, Protective Devices
- Schweitzer & Conrad, Inc.

Crapo GALVANIZED PRODUCTS

Seven Wire Steel Strand

Telephone and Telegraph Wire

Crapo Galvanized Steel Strand is quickly, easily and economically served. Its *pure zinc* coating is so adherent and so ductile that it withstands vigorous bending and twisting without cracking or peeling. This insures corrosion-resisting joints, longer years of service, lower maintenance costs.

Crapo Galvanized Seven Wire Steel Strand and Telephone and Telegraph Wire are available in all standard grades and sizes.

Indiana Steel & Wire Co.
Muncie, Indiana

CHROMALOX

SUPER-SPEED RANGE UNITS

restore old ranges to better-than-new cooking speed, and cut service calls 'way down. Profitable all 'round—to dealer, to power company, to user. Get details of the sales campaign—successful everywhere.

EDWIN L. WIEGAND CO.
PITTSBURGH, PA.

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MONTGOMERY BROTHERS
911 Western Ave., Seattle, Wash.
524 S. W. Pine St., Portland, Ore.
61 Fremont St., San Francisco, Calif.
912 E. 3rd St., Los Angeles, Calif.

THE PETERSON COMPANY
1921 Blake St., Denver, Colo.

. . . about the Trade

Western Apex Men Receive Promotions

Recognition of two of its Western executives was given by the Apex Electrical Manufacturing Co., of Cleveland, in the appointment of G. B. Schuyler, vice-president and general manager of the Apex-Rotarex Manufacturing Co., of Oakland, as a director in the parent

G. B. SCHUYLER

organization and the appointment of J. Fred Stephens, Jr., as advertising and sales promotion manager for the parent organization at Cleveland.

Mr. Stephens has been advertising and sales promotion manager for the Oakland factory branch for several years. He will divide his time between Oakland and Cleveland, preferring to

J. F. STEPHENS, JR.

keep his residence in the West. According to Mr. Schuyler, Mr. Stephens' promotion represented national recognition of the success attained by the coast organization and a desire to employ national methods worked out in newspaper advertising and cooperation with dealers in the West. Sales in the West during the past year have been 50 per cent above last year's figures, according to Mr. Schuyler.

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• WIEDENTHAL - GOSLINGER ELECTRIC Co., pioneer motor dealer and industrial contractor of San Francisco, has announced a change in management upon the resignation of Seth Butler, who recently returned to the lumber business. H. E. Boland, who has been with the firm seventeen years, and Clarence B. Lindstrom, formerly with Fransworth Electric Works in San Francisco, are jointly operating the firm under the new arrangement.

•

• BUZZELL ELECTRIC WORKS, San Francisco, according to Louis Douat, manager, has become the industrial agent for Fairbanks-Morse Co., motor and control equipment. Consideration of the Fairbanks-Morse complete line of industrial machinery and equipment as well as its motors caused this pioneer motor dealer and industrial electrical contracting firm to make the new connection in anticipation of enlarging the scope of its industrial installation business, according to Mr. Douat.

•

• HARRY BROWN, member of the Alhambra, Calif., firm of Brown and Weber, Hotpoint dealers, has announced the opening of a new electrical store at Washington St. and Lake Ave. in Pasadena, Calif. The new store also will feature Hotpoint products.

A NEW DEVELOPMENT IN DISPLAY LITE-ING FOR ALL SHELF MERCHANDISE

No. 888

S & M DISPLAY CASE LITES OPEN NEW FIELD FOR VOLUME SALES AND ELECTRIC LOAD BUILDING

Proper illumination of merchandise will increase sales in practically every type of store—featured products invariably sell faster when brilliantly lighted.

S & M Display Case Lites are specially designed to adequately illuminate any open shelf display of merchandise.

Drug Stores, Liquor Stores, Department Stores, Grocery Stores and Automotive Stores are just a few of the many types of retailers who are a ready market for Display Case Lites.

S & M Display Case Lites make a beautiful installation which harmonizes with the most modern interiors. The Lites are constructed of pure sheet aluminum, have a brightly polished aluminum cap, chromium rod and red lacquered outlet box. Completely wired, ready to install with conduit, wiremold, BX or flexible cord.

No. 888—9½" diam. $7.00
Uses 200-watt inside frosted lamp.
No. 444—7" diam. $6.00
Uses 100-watt inside frosted lamp.
Write for detailed information.

S & M LAMP CO. 36th & Broadway LOS ANGELES

• MANY PACIFIC COAST PEOPLE attended the formal preview of the new 1936 line of Hotpoint electric ranges and water heaters at Chicago on Dec. 14, 1935. Included were Glenn Jackson, California Oregon and Mountain States Power Co.; J. A. Lockhart, Pacific Power & Light Co.; S. M. Ingraham, Idaho Power Co.; O. E. Crites, Portland General Electric Co.; S. S. Brundage, General Electric Supply Co., Spokane and E. L. Collins, General Electric Supply Corp., Seattle. In addition the following members of the Pacific Coast organization of the Edison General Electric Appliance Co. attended: Harold Conklin, C. A. Willard, Clyde Allen, Joe Platt and B. W. Rowley. Similar previews will be held early in the year in various Western cities.

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• B. K. SWEENEY, INC., Denver, with 250 per cent; the George Belsey Company, Ltd., Los Angeles, with 199 per cent; Electric Appliances, Inc., San Francisco, with 193 per cent; and General Electric Supply Corp., Portland, with 185 per cent, placed second, fifth, seventh and ninth, respectively, in the eight weeks' fall sales drive of General Electric specialty appliance division recently concluded.

•

• FRANK D. FAGAN, well known on the Pacific Coast several years ago as the representative of the Thomas A. Edison Co., and later for several years for the General Electric Co. in Japan, has returned to the Pacific Coast and is now representative in northern California for Burnand & Co., Los Angeles, manufacturers of the "Kookador". Invented by J. P. Freemon, it is a new table appliance combining the features of the toaster and grill. Mr. Fagan also represents in northern California, Oregon and Washington the J. R. Clark Co.; the Fada Radio Company in northern California; Brown & Brockmeir, manufacturers of B-Line motors; the Sola Company, Neon sign transformers, and the Lowell Insulated Wire Co., Lowell Mass. His headquarters are at 244 9th St., San Francisco. A display of the Kookador is being made in the permanent exhibit of the Bushnell Sales Co. on the seventh floor of the Western Furniture Exchange at 180 New Montgomery St. Mr. Bushnell will be associated with Mr. Fagan in furthering the sale of Kookador. The Bushnell Sales Company also handles Fada Radios, the Radiobar and Potter Air Conditioned Refrigeration.

•

• A. O. THERRIAULT has been named to succeed R. A. Jacobus as Denver salesman of General Electric Supply Corp. Mr. Therriault has been a successful contractor-dealer in Idaho and in Washington. Mr. Jacobus has opened a firm of his own, the Jacobus Electric Shop at 2029 East Colfax Ave., Denver.

•

• FRIEND-CHRISTY ELECTRIC CO., at Santa Ana is having the honor of seeing a new city hall building being constructed where their former store used to be at 211 North Main St. They have since moved to 223 North Broadway, where an amplified merchandise display was installed.

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• CALKINS & CALKINS have opened a household appliance store at 118 North Commercial St., Inglewood, Calif. In addition to a large display space, the store contains an elevated platform from which weekly cooking schools are conducted.

•

• PACIFIC COAST DISTRIBUTORS for the refrigeration department of the Westinghouse Electric & Mfg. Co., won the highest sales record with an average of 201 per cent of quota in a recently completed national sales campaign. Three distributors, H. E. Saviers & Son, of Reno, the Westinghouse Electric Supply Co. of Salt Lake City, and the Electric Supply Distributing Company of San Diego, attained sales records of more than 300 per cent of quota. The campaign was characterized as the most successful in the history of the department.

•

• FAMOUS GAS & ELEC. APPLIANCES is the newly opened appliance store at 4453 Whittier Blvd., Los Angeles.

• F. J. AIREY CO. has been named representative in southern California for the Lake Manufacturing Co. Inc., of Oakland, manufacturers of bells, buzzers, horns, annunciators and special signaling systems. Nevada and Arizona are also included in the territory. The Airey company now also represents Wiremold Co., Curtis Lighting, Inc., Inland Glass Co. and the Railley Corp. for southern California and Arizona. Harry Barnard, for many years Curtis Lighting representative, has joined Mr. Airey as illuminating engineer.

•

• F. MANSUR, electrical engineer, formerly associated as an appliance salesman with Gilbert Weston Stearns Electric Co., of Santa Ana, has joined the staff of the Southern California Edison Co. He is in the commercial and power division.

•

• H. H. VAN LUVEN announces additions to his line, as manufacturers' agent. He is handling the following lines in southern California (north to Fresno) as well as for Arizona: S. H. Couch Co., Inc., telephone, signal and sound equipment; J. M. Lenz Mfg. Co., telephone switches, cables, etc.; Cannon Electrical Development Co., sound plugs, motor plugs, etc.; Thomas & Smith, bells, buzzers, etc. His agency is located at 308 Fourth St., Los Angeles.

•

• W. M. RUMSEY, with stores at Fulton, Auburn and Placerville, recently took over the appliance business of F. H. McGinnis, 1014 12th St., Sacramento. Mr. Rumsey has already begun to continue the aggressive merchandising policy followed by his predecessor.

•

• COMMERCIAL ELECTRICAL PRODUCTS CO. recently moved from 513 West Washingon St., Los Angeles, to 619 West Ninth St.

PROFESSIONAL SERVICES

ELECTRICAL TESTING LABORATORIES

Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.

80th St. and East End Ave., New York

ARTHUR R. KELLEY
CONSULTING ENGINEER

Reports and Valuations, Public Utility Industrial Properties

Edison Bldg. Los Angeles

Classified Section

• COST of undisplayed classified ads is 5 cents a word, minimum $1.00 insertion. Box numbers in care of our San Francisco office count as 10 words additional in undisplayed ads.

• RATES per column inch of displayed ads is $3.75.

• ALL classified ads are payable in advance.

ELECTRICAL WEST 883 Mission Street San Francisco, Calif.

POSITIONS AVAILABLE

WANTED—Inside electrical construction superintendent, experienced in inside wiring of large commercial and industrial buildings, light, power, telephone, fire alarm and nurses calling systems; college man desired with extensive construction experience, must have good personality, capable of contacting general contractors, architects and owners. Apply Box 25, Electrical West, 883 Mission St., San Francisco, Calif., giving education, experience, references, age and other complete information, also last position held.

...in New Equipment

Advanced 1936 Hotpoint Range Models

"The Dawn" and "The New Era", the first 1936 electrical range offerings of the Edison General Electric Appliance Co., Inc., feature advance style, design, and construction. "The Dawn" is a table top model and "The New Era" is of the new built-to-the-floor construction to harmonize with modern kitchen. It is in triple-coat white or cameo ivory porcelain enamel with chromium trim and is mounted on a glossy black, baked enamel base which provides ample toe space. "The Dawn" is finished in French gray or white porcelain. Both models have three high speed Calrod surface units, controlled by a thermostat and a switch on the switch panel, Thrift cooker, oven and large warmer drawers. Two large utility drawers are additional features of "The New Era".

●

Sangamo Maximum Demand Register

The new Sangamo Type HG maximum demand register, retaining all of the essential features of previous Sangamo demand registers, has been greatly improved by the incorporation of a simpler interval selector and interval reset mechanism. This register with its 100 tooth worm wheel construction can be applied directly to any service type HF meter, or HC meter by changing the meter spindle and upper bearing to 100 tooth construction, and to any service type H meter by using a mounting bracket having the necessary gears incorporated, to equalize the difference in the fundamental test constants between Sangamo types H and HF meters. These meters are made by the Sangamo Electric Co., Springfield, Illinois.

●

New Total Time Meter

The Total Time Meter, for totalizing running or idle time on electrically operated machinery, including machine tools, welders, electric signs, refrigerators, radio transmitters or any individual a-c powered unit, has been announced by Westinghouse Electric & Manufacturing Co. The meter is suitable for any application where it is desirable to know the total number of hours during which a circuit is energized or apparatus is in operation. Four dials register up to 9,999 hours before repeating. The meter includes a 120 volt a.c., 60 cycle, synchronous motor contained in a two piece Moldarta case. The motor is of the slow speed, sub-synchronous type, with jewelled bearings. Optional is a special register providing one revolution per hour of the sweep hand. With this register, data in fraction of hours can be obtained.

Bakelite Tumbler Switch

The Arrow-Hart & Hegeman Electric Co., Hartford, Conn., has placed on the market a new line of type C tumbler switches. The line is designed specifically for modern, high intensity lighting, and to take any type C lamp load of 1,250 watts made up of lamps of any size. Features of the line include full floating contacts which are self-aligning and automatically adjusting, tapered stationary contacts, arc snuffers on both sides and between the moving contacts to quench any arc, and a dust-proof, dirt-proof Bakelite base.

●

Indoor Floodlight of New Design

Wilson Lighting, Inc., Chicago, has placed on the market an indoor floodlight, type 670, which is announced as a unit of unique design. The floodlight features a new runner-mounting construction which provides a two-point suspension for the reflector, and permits

the use of one-screw universal adjustment. Furnished with each reflector are a large portable type base and a small cast base for screw-down permanent mounting. The reflector is of highly polished, non tarnishing alloy. The unit is completely wired with heater cord and plug, has a porcelain socket, and will accommodate 150 to 250 watt lamps. A color-holder and set of color screens are included.

●

Squirrel Cage Induction Polyphase Motor

Century Electric Co., St. Louis, Mo. is marketing a new line squirrel cage normal torque and high torque motors which are especially designed for refrigeration and air-conditioning applications. For mechanical stability the construction includes cast frame and end brackets, ample sized shafts and bearings and well anchored field and rotor cores. Electrical ruggedness is provided by the use of electrolytic copper bars and end rings so joined as to form an homogeneous high conducting joint. These motors are available in sleeve or ball bearing designs as required and are available in sizes of 600 hp. and smaller.

For Grease Racks

Novel application of the patented Flexo-dome lighting fixture principle to a grease rack lighting unit is made in the Lube-Ray unit, manufactured by the Wuelker Flexo-Dome Co., San Francisco. The unit is a shallow aluminum, glass enclosed and protected reflector, fitted with a 50-watt rough service bulb, attached by means of the flexible pipe Flexo-Dome to an outlet box. It is designed for installation permanently attached to the lift rails, about 18 in. from the center, where it will be protected and will clear all projections, at the same time providing a safe, quickly adjusted light for seeing under the chassis of a car during greasing or repair work.

●

Curtis' "LightStrip" Unbroken Line of Light

Curtis "Lumiline LightStrip," developed and manufactured by Curtis Lighting, Inc., Chicago, makes possible lines of continuous light, such as is not possible with conventional gaseous tubes. By using the new Curtis Lumiline Lamp and Lumiline LightStrip together, unbroken lines of colored light can be achieved without the customary dark spots. An 18-inch length of Lumiline LightStrip will give a soft lighting effect while a 60-watt lamp on the same strip gives light of sufficient intensity for better seeing. To accommodate the terminal end of the lamp, the strip unit has receptacles at each end which hold the snap-in caps fastened on each end of the lamp. Screw base sockets are not used. The bright aluminum reflector is highly polished and the other parts are cadmium plated. The Lumiline LightStrips can be used for panel lighting, cove lighting, direct or indirect lighting, wall and display cases, and other similar uses.

●

New Kearney Fuse Switch

The new "Trip-O-Link" rural line fuse switch is offered by the James R. Kearney Corp., St. Louis, to meet the demand for a rural line switch where capacities are limited. It has a single fog type insulator with contacts bolted to the insulator at the top and the bottom. The lower contact is formed into a coil spring to provide tension on the link and to insure clearance when the link blows. Installation is simple. The switches are light in weight, ranging from 5½ lbs. for the 15,000 volt switch, 51 lbs. for the 7500/12000 volt to 3 lbs. for 5,000 volt switch, weights which permit their use on small poles and light-weight crossarms.

●

Portable Buffet Range

Southern Metal Products Corp., Huntsville, Ala., has announced the "Economaster," a small portable buffet type electric range with a rating of 1,500 watts. It includes a top plate, a 14x13x8-in. oven and a cabinet with two folding side shelves, drawer and large storage compartments. It incorporates a three-heat switch and an indicating thermometer. Standard equipment includes a six-piece aluminum set. Retail price is $25 f.o.b. factory.

...in Trade Literature

SQUARE D COMPANY has just issued its catalog in the form of what it terms "Square D Digest," presenting prices, developments, data and general information regarding the company and its products. The book gives all pertinent information in listing the various products with thumb index on the side and numerical index of all products at the back of the book. The book contains 63 pages and cover.

●

WASHING MACHINE REPAIR PARTS CATALOG —Electrical Appliance Service Corp., of 918 South Flower St., Los Angeles, Calif., has compiled the most comprehensive catalog and price list yet published of washing machine repair parts of all makes. The catalog is unique in that it contains listings of parts of makes of washers now out of production. It provides one of the only means of obtaining replacement parts for such machines. The catalog is also complete with illustrations and diagrams showing the various parts and working members. Manufacturers' original parts are handled in all cases except where manufacture has ceased. Where parts are no longer made this company is equipped to make and supply such parts. The company also provides a motor rewinding service for small appliances and motors up to 1 hp. A similar catalog on vacuum cleaner parts is also available.

●

GLORIFIED LIGHT—An unusual and valuable booklet prepared by the Pittsburgh Plate Glass Co., Paint Division, should prove a useful selling tool for any lighting salesman. It is a fine symposium on good lighting and good paint as adjuncts to the science of seeing. It contains articles by Matthew Luckiesh, Samuel G. Hibben and other lighting authorities and is illustrated with some effective dramatic photographs showing the difference between lighting installed in rooms painted with paints of varying reflecting values.

●

"THE ELECTRIC EYE in Theory and Practice," a 32-page booklet, containing complete information on the "electric eye" and illustrated with thirty diagrams has been published by the manufacturers of the "Eby Electric Eye," Hugh H. Eby, Inc., 2066 Hunting Park Ave., Philadelphia, Pa. This booklet contains a great deal of new material on all types of photo-electric cells and discusses the present and future possible adaptations of these cells in a wide variety of work. It is sent free to electrical and industrial executives requesting it on company stationery. To others the booklet is priced at 50c.

●

DUPLEXALITE DIVISION of the Miller Co., Meriden, Conn., has just published catalog No. DP-184 which covers the complete line of Duplexalite lighting fittings for commercials and residential applications. Specifications, descriptions, and illustrations of the various units and fitting manufactured are given. The bulletin features many typical installations of this product.

●

A COMPLETE SALES PLAN for developing commercial lighting business has been prepared by the Lightolier Co., New York City, for use by public utilities in cooperation with contractors and dealers. Copies of the plan are available to utility executives.

●

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., has prepared Bulletin 1168 entitled "Mercury Arc Rectifiers for Power Conversion in Electrolytic Plants". The bulletin contains complete data as to application and engineering features of this type of equipment.

●

"RURAL LINES CONSTRUCTION" is the title of a new publication issued by Hubbard and Co., Pittsburgh, Pa., and Oakland, Calif. Published in the form of a blue line print, it gives various detail drawings of different types of rural line construction as well as dimensions and data of Hubbard equipment suitable for this application.

●

ANACONDA WIRE & CABLE CO., New York City, has issued two new bulletins which are available upon application. Publication No. 3-18 covers bare and weatherproof wire and cable with complete physical and electrical data. Publication No. 351 covers rubber-insulated wire and cable for every type of service.

●

EDISON GENERAL ELECTRIC APPLIANCE CO., Chicago, has just issued two new catalogs, one covering Hotpoint automatic electric water heaters and the second Hotpoint automatic electric ranges. In addition to complete information on the Hotpoint line of both these appliances, the publications contain much useful sales information.

●

"ALCO ALUMINUM and Its Alloys" in revised form has been prepared for distribution by the Aluminum Company of America, Pittsburgh, Pa. The booklet, ninety-one pages in length, illustrates and concisely describes some of the fundamental information concerning the alloys which are produced by this company.

●

"CABLE COMPOUNDS for Insulating and Sheathing Cable" is the title of a bulletin just issued by the General Electric Co., Schenectady, N. Y. The bulletin lists the various rubber and rubber-like cable-insulating and sheath compounds now available, and explains how some of the most commonly used ingredients affect the dielectric strength, physical strength, and aging characteristics.

●

GENERAL CABLE CORP., New York City, has issued three new bulletins for general distribution to the electrical industry. "Conductor Data—Rural Electrification" deals with rural line construction and gives complete data on physical and electrical characteristics of various types of conductors. "Service Entrance and Service Drop Cables" covers the new technique permitted by this type of conductor. "Advance in Cable Design" deals specifically with paper-insulated power cables.

●

HOW TO SELL THE WESIX ELECTRIC HEATER, an advertising brochure prepared by the Wesix Electric Heater Co., San Francisco, for use of salesmen and dealers is now in its fourth edition. Available from the manufacturer, 390 First St., San Francisco.

●

HUBBARD AND CO., Pittsburgh, Pa. and Oakland, Calif. has released a new bulletin on Hubbard pole line hardware for telephone construction. This bulletin illustrates and describes the complete line of Pierce telephone specialties and Hubbard telephone hardware.

●

"A USEFUL PUMPING Unit for Every Industry" is the title of leaflet No. 2199 recently published by Allis-Chalmers Manfg. Co., Milwaukee, Wis. The construction details of this unit and its various industrial applications are described and illustrated.

●

PANEL-TYPE ELECTRICAL measuring instruments, manufactured by the Weston Electrical Instrument Corp., Newark, N. J., are presented in their new bulletin which contains specifications, dimensional drawings, illustrations, and prices for the 2, 3 and 4-inch line of instruments in both the round and rectangular types.

WHERE TO BUY IT IN THE WEST

Selling Hints

FOCUS THE BUYER on your listing in "Where to Buy" with a display box. This advertising SELLS goods and costs so little.

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883 Mission St. San Francisco

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General Elec. Co.
Graybar Elec. Co., Inc.

Anchors, Guy
James R. Kearney Corp.

Appliances, Household
Edison Gen. Elec. Appliance Co., Inc.
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
McGraw Elec. Co.
Waters-Genter Div.
Westinghouse Elec. Supply Co.

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General Elec. Co.

Bus Fittings
Burndy Eng'g Co.
General Elec. Co.

Brackets, Wood
Locust Pin Co.

Buses
Aluminum Co. of America ..

Cable Accessories
General Cable Corp.
General Elec. Co.
John A. Roebling's Sons Co.

Cables
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American Steel & Wire Co.
Columbia Steel Co.
Crucible Steel Co. of America
General Cable Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Maydwell & Hartsell, Inc.
National Elec. Products Corp.
Providence Insulated Wire Co.
John A. Roebling's Sons Co.
Westinghouse Elec. & Mfg. Co.

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Carbon Products
National Carbon Co., Inc.

Chimes
Square D Co., Inc.

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General Elec. Co.
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Three of the major problems in secondary distribution can now be solved, economically, by the use of this newly developed product. The new cutout:

1. Makes banking of transformer secondaries practical, resulting in diversity of loading and reduction of light flicker.

2. Protects transformers from secondary faults, because it can be installed in the secondary leads of transformers and closely co-ordinated with primary fuses and relays.

3. Isolates service-entrance faults because it can be co-ordinated with other secondary fuses.

IT WILL PAY YOU TO INVESTIGATE THIS 100-AMP, 250-VOLT CUTOUT

Initial cost is low; it can be installed with any type of secondary construction having conductors up to 2/0; and it is readily attached to the clamp-type terminals of G-E distribution transformers. Order a sample for examination, specifying Cat. No. 9F7A1. General Electric, Schenectady, N. Y.

340-21

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General Electric
Dept. 6A-201, Schenectady, N. Y.

Send me a copy of your bulletin GEA-2261, describing the G-E indicating secondary fuse cutout.

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Company_____

Address_____

City_____ State_____

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Compounds, Insulating
General Cable Corp.
General Elec. Co.

Condensers, Electric
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Conduit
Aluminum Co. of America
General Elec. Co.
Youngstown Sheet & Tube Co.

Conduit, Underground
Fire Proof Wall Co.
Johns-Manville Corp.

Connectors
Burndy Eng'g Co.
James R. Kearney Corp.

Controllers
Clark Controller Co.

Cutouts
James R. Kearney Corp.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Demand Control
General Elec. Co.
Wesix, Inc.

Distribution Specialties
General Elec. Co.
James R. Kearney Corp.
Maydwell & Hartzell, Inc.
St. Louis Malleable Casting Co.

Electrodes, Arc Welding
John A. Roebling's Sons Co.
General Elec. Co.

Fans
General Elec. Co.

Farm Electrification Equipment
General Elec. Co.

Fittings, Conduit
General Elec. Co.

Fittings, Insulator
Brewer-Titchener Corp.

Fixtures, Lighting
General Elec. Co.
Smoot-Holman Co.

Floodlighting
General Elec. Co.
S & M Lamp Co., Inc.
Smoot-Holman Co.

Gasoline
Union Oil Co.

Generators
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Graphite Products
National Carbon Co., Inc.

Ground Rods
Crucible Steel Co.
Maydwell & Hartzell, Inc.

Heaters, Air
Edison Gen. Elec. Appliance Co.
Noblitt-Sparks Industries, Inc.
Thermador Elec'l Mfg. Co.
Wesix Inc.
Edw. L. Wiegand Co.

Heaters, Water
Edison Gen. Elec. Appliance Co.
Fowler Mfg. Co.
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
Sandoval Sales Co.
Thermador Elec'l Mfg. Co.
Wesix Inc.
Westinghouse Elec. & Mfg. Co.

Heating Element—Repair Part
Edw. L. Wiegand Co.

Instruments, Measuring and Recording
The Bristol Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l. Instrument Corp.

Insulation
General Elec. Co.
Johns-Manville Corp.

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Brewer-Titchener Corp.
Corning Glass Works
Graybar Elec. Co., Inc.
Hemingray Glass Co.
Geo. E. Honn Co.
Lapp Insulator Co., Inc.
McLaughlin Glass Co.
Owens-Illinois Glass Co.
Westinghouse Elec. & Mfg. Co.

Ironers
General Elec. Co.
Savage Distributing Co.

Knobs, Tubes, Cleats
Standard Elec'l Porcelain Mfrs.

Lamps, Mazda
General Elec. Co.
Westinghouse Lamp Co.

Lamps, Student
Lumidor Mfg. Co., Inc.

Lamps, Sun
General Elec. Co.

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Wuelker Flexo-Dome Co.

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L. A. Nott
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Corp.

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Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Motor Starters
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Oil, Lubricating
Associated Oil Co.
Union Oil Co.

Oil, Transformer & Switch
Associated Oil Co.
General Elec. Co.
Union Oil Co.

Panel Boards
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Westinghouse Elec. & Mfg. Co.

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General Elec. Co.
Weston Elec'l Instrument Corp.

Pins, Wood
Locust Pin Co.

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Brewer-Titchener Corp.
General Electric Supply Corp.
Graybar Electric Co., Inc.
Hubbard & Company
Joslyn Co. of Calif.
Kortick Mfg. Co.
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PROMPT SERVICE ON CARBON BRUSHES

Our San Francisco Finishing Plant is prepared to make prompt delivery on all grades of National Pyramid Brushes.

A GRADE FOR EVERY TYPE OF BRUSH USING EQUIPMENT

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Carbon Sales Division
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Pacific Coast Sales Manager: WM. P. SWARTZ
629 S. Serrano, Los Angeles, Calif.

Porcelain
Standard Elec. Porcelain Mfrs.

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Idaho Power Co.
Mountain States Power Co.
Northwestern Electric Co.
Pacific Gas and Electric Co.
Pacific Power & Light Co.
Portland General Electric Co.
Puget Sound Power & Light Co.
San Diego Cons. Gas & Elec. Co.
San Joaquin Light & Power Corp.
Southern California Edison Co. Ltd.
Utah Power & Light Co.
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Edison Gen. Elec. Appliance Co.
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Edison Gen. Elec. Appliance Co.
General Elec. Co.
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The Bristol Co.
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Colt's Patent Fire Arms Mfg. Co.
Square D Co., Inc.

Switches, Time
General Elec. Co.
Sangamo Elec. Co.

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Allis-Chalmers Mfg. Co.
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For Dry Type Industrial and Signal Use

***Repair Service* for distribution transformers, Auto-starters and similar equipment.**

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Pacific Coast Elec'l Ass'n
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Strand, Guy
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General Elec. Co.
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James R. Kearney Corp.

Transformers
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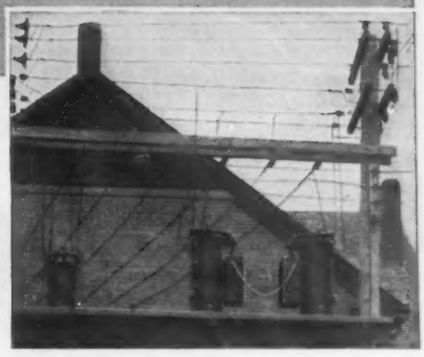
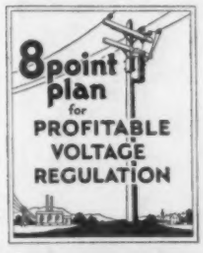
How These G-E Branch-feeder Induction Voltage Regulators SAVED

A Much Larger Investment
RETURN
40% of Their Cost Annually
IMPROVE SERVICE
by Maintaining Proper Voltage Level



WATHENA, Kansas, is now enjoying good voltage regulation. This town of 1000 is served by a 6-mile, 2300-volt, 3-phase line. Voltage was formerly regulated at the power-plant end, but at peak loads the voltage drop was excessive. To raise the line voltage would have cost $7000 for rebuilding. The regulators installed cost only $1900 — resulting in a saving in capital investment of nearly three times their cost and in a great improvement in service. Furthermore, it is estimated that increased revenue, from this circuit voltage, will pay an annual return of 40 per cent on the investment.



G-E offers regulating equipment for every vital point on the system.

GENERAL ELECTRIC

General Electric
Dept. 6B-201, Schenectady, N. Y.

Send me your folder GES-1142 describing the 8 Point Plan for Profitable Voltage Regulation.

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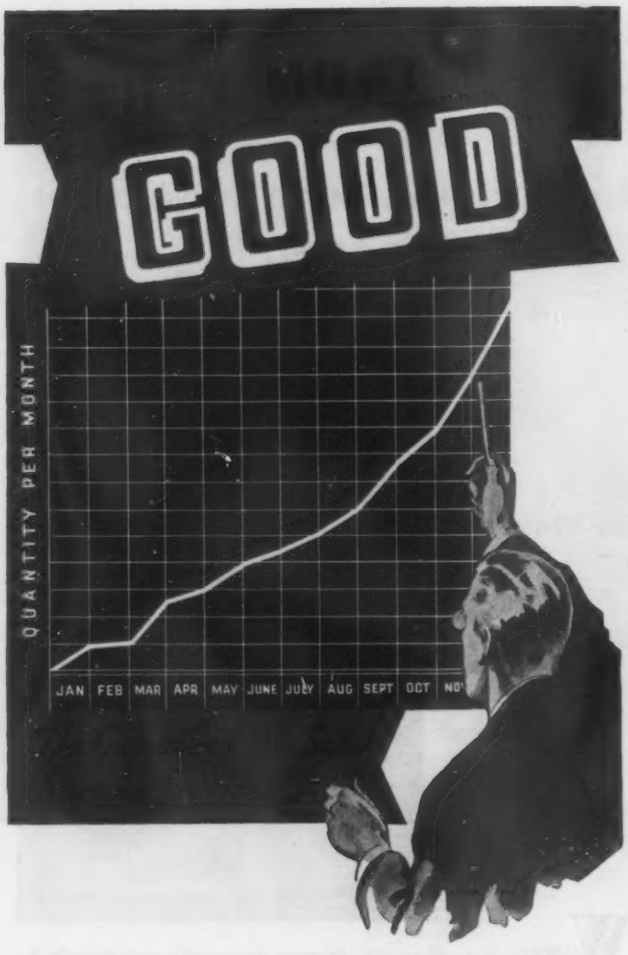
Company_____
Address_____
City_____ State_____

350-119



OPERATORS and electrical manufacturers alike have indicated their acceptance of the new "SA" Series Brushes by ordering again and again. A steadily rising sales curve reflects the universal satisfaction these brushes are giving—They MUST Be Good.

The "SA" Series consists of five electro-graphitic grades—SA-25, SA-30, SA-35, SA-40 and SA-45. These grades, definitely graduated in performance characteristics, cover a wide range of application on motors and generators in power and industrial service.

Their established superior performance merits a trial on your equipment.

There is a National Pyramid Brush for every class of service.

NATIONAL CARBON COMPANY, INC.
Carbon Sales Division, Cleveland, Ohio
Unit of Union Carbide UCC and Carbon Corporation
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Where to Buy It in the West—Continued

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Pelton Water Wheel Co.

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American Steel & Wire Co.
Columbia Steel Co.
Crescent Ins. Wire & Cable Co.
Crucible Steel Co.
General Cable Corp.
National Elec. Products Corp.
Westinghouse Elec. Supply Co.

Wiring Supplies
Associated Sales Engineers
Bryant Electric Co.
Gen. Elec. Supply Corp.
Graybar Elec. Co., Inc.
General Elec. Co.
Graybar Elec. Co., Inc.
Hart Mfg. Co.
Indiana Steel & Wire Co.
Maydwell & Hartzell, Inc.
Pacific Wire Rope Co.
Providence Insulated Wire Co.
John A. Roebling's Sons Co.
Westinghouse Elec. & Mfg. Co.

INDEX TO ADVERTISERS

January 1936

Allis-Chalmers Mfg. Co.	4
Aluminum Company of America	6
Brewer-Titchener Corp., The	62
Bristol Company, The	60
Burndy Engineering Co.	72
California Oregon Power Co.	38, 39
Classified Section	67
Corning Glass Works	2, 3
Edison General Elec. Appliance Co., Inc.	11, 12, 13, 14
Frigidaire Corporation	15
General Electric Co.	5, 7, 9, 70, 71
Graybar Elec. Co., Inc.	8
Honn Co., Geo. E.	65
Idaho Power Co.	38, 39
Indiana Steel & Wire Co.	65
International Nickel Co.	16
Jeffries Transformer Co.	71
Kearney Corp., James R.	67
Lapp Insulator Co., Inc.	61
Locust Pin Co.	61
Maydwell & Hartzell, Inc.	61
Mountain States Power Co.	38, 39
National Carbon Co., Inc.	70, 72
Northwestern Electric Co.	38, 39
Owens-Illinois Glass Co.	59
Pacific Coast Electrical Bureau	Back Cover
Pacific Gas and Electric Co.	Inside Back Cover
Pacific Power & Light Co.	38, 39
Portland General Electric Co.	38, 39
Professional Directory	67
Providence Insulated Wire Co.	61
Puget Sound Power & Light Co.	38, 39
S & M Lamp Co.	66
Savage Distributing Co.	71
Smoot-Holman Co.	10
Southern California Edison Co., Ltd.	Inside Front Cover
Square D Company, Inc.	63
Standard Electric Stove Co.	71
Utah Power & Light Co.	38, 39
Washington Water Power Co.	38, 39
Westinghouse Elec. & Mfg. Co.	17, 18, 19, 20
Wiegand Co., Edw. L.	66

Effective at once, Commercial Lighting rates are reduced throughout the P.G. and E. system. Phone or write for a handy table of savings. While you are thinking about these savings, give a thought to your present lighting facilities. Bear in mind that tremendous strides have been made in store and office lighting during the past few years. Ask yourself if your own equipment is really modern, or even adequate, measured by present day standards. If you have any doubt about it ask us for a Sight Meter test. It's quite possible that your savings, under the new rates, would take care of all the additional light you might need. Find out, anyway. The Sight Meter test is FREE.

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Less than 50 years ago the electrical industry could be compared to a mere seedling, requiring care and much cultivation. Today it is like a sturdy young tree with its roots implanted firmly in the life of today and its branches spread in all directions.

While the electrical industry is growing by leaps and bounds, it has by no means reached the limit of its development or possibilities for any branch of the industry. The sales field is particularly fertile.

In the home, on the farm, in the store, office and factory—the surface has hardly been scratched. Each year the sales of electrical appliances double and triple in volume, and yet only a comparatively small percentage of homes are completely equipped electrically.

It is a healthy, growing business—one in which persistence, patience and push reap a profitable harvest.

Pacific Coast Electrical Bureau

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